ANNUAL REPORT

OF THE

County Medical Officer of Health,

County Donegal

ON THE

Health and Sanitary Conditions

of the County

AND ON THE

County School Medical Service

YEAR 1940.

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Chomhairle Chonndae Dhún na nGall.

A Dhaoine Uaisle,

Is mór agam d'onóir an cuntas cinn-bliadhna seo do chur fé nbhúr mbrághaid fé mar atá de dhualgas orm do réir na n-ordughad so leanas: Ordughadh na Liaigh-Fheadhmannach Conndae, 1926, agus Ordughadh Sláinte Puiblidhe (Liaigh-Riaradh Leanbhaí) a 1920.

Mise, le meas,

M. BASTABAL,

Liaigh-Fheadhmannach Conndae.

Aibreán, 1941.

DONEGAL BOARD OF HEALTH.

Staff of Public Health Department

Year ending 31st December, 1940.

County Medical Officer of Health :

M. S. BASTABAL, M.D., D.P.H. (M. J. BASTIBLE).

Assistant County Medical Officers of Health :

M. J. McCOLGAN, M.B., B.Ch., B.A.O., D.P.H., B.Sc., L.M.

R. HAYES, M.B., B.Ch., B.A.O., D.P.H., B.Sc. (P.H.), L.M.

County Ophthalmic Surgeon (Part Time) :
G. O'DONNELL M.B.

School Dental Officers (Part Time) :

JOSEPH R. KELLY, B.D.S.
J. VINCENT CALLAGHAN, L.D.S.

Public Health Nurses :

Full Time—MISS ANNE CASEY.

MISS MARGARET T. McLAUGHLIN.
MISS A. J. MEEHAN (Temporary appointment).

Part Time—THE JUBILEE AND DUDLEY NURSES employed in the following areas :—Annagry, Ardara, Arranmore, Ballybofey and Stranorlar, Ballyshannon, Bruckless, Buncrana, Bundoran, Carndonagh, Carrigart, Clonmany, Convoy, Derrybeg, Donegal, Doochary, Drumholm, Dunfanaghy, Dungloe, Fahan and Inch, Fanad Upper, Fanad Lower, Frosses, Glencolumbkille, Gortahork and Falcarragh, Kilcar, Letterkenny, Lifford and Castlefin, Malin, Moville, Muff and Upper Moville, Ramelton, Rathmullan and Glenvar.

Clerk : SEAMUS O CEALLAIGH.

PART I.

ANNUAL REPORT

OF THE

COUNTY MEDICAL OFFICER OF HEALTH

COUNTY DONEGAL,

ON THE

HEALTH AND SANITARY CONDITIONS OF THE COUNTY.

YEAR 1940.

ANNUAL REPORT ON THE HEALTH AND SANITARY CONDITIONS of the COUNTY.

YEAR 1940.

POPULATION.

The population of County Donegal, comprising an area of 1,193,581 statute acres, was 142,310 according to the revised Census of 1936. The population for the several years from 1821 to 1936 was as follows :—

1821	...	248,270	1881	...	206,035
1831	...	289,149	1891	...	185,635
1841	...	296,448	1901	...	173,722
1851	...	255,158	1911	...	168,537
1861	...	237,395	1926	...	152,508
1871	...	218,334	1936	...	142,310

The following shows the distribution of the population according to Urban and Rural Districts since the Census of the year 1911.

DISTRICT.	1911 Census	1926 Census	1936 Census
URBAN DISTRICTS.			
Buncrana U.D. ...	1,874	2,309	2,295
Bundoran U.D. ...	2,116	1,339	1,351
Letterkenny U.D. ...	2,194	2,308	2,649
RURAL DISTRICTS.			
Ballyshannon R.D. ...	7,772	7,509	6,628
Donegal R.D. ...	19,616	16,552	14,780
Dunfanaghy R.D.	15,471	14,252	13,559
Glenties R.D. ...	32,800	30,081	27,562
Inishowen R.D. ...	33,037	30,545	28,285
Letterkenny R.D. ...	9,961	8,782	8,496
Milford R.D. ...	19,293	16,884	15,497
Stranorlar R.D. ...	23,503	21,947	21,090
TOTALS	168,537	152,508	142,192

Letterkenny, Buncrana, Bundoran, and Ballyshannon are the four largest towns in Donegal.

The following table shows the population of the towns in County Donegal, according to the 1936 Census.

Towns with Population over 200.		Towns with Population under 200	
Town	Population.	Town	Population.
Letterkenny	2,649	Creeslough	199
Buncrana	2,295	Cross Roads	171
Ballyshannon	2,223	Killygordon	165
Bundoran	1,352	Kilmacrenan	155
Donegal	1,315	Carrigans	154
Moville	937	Clonmany	123
Rathmelton	924	Carrowkeel	120
Raphoe	754	Kilcar	117
Ballybofey	736	Manor Cunningham ...	117
Carndonagh	660	Carrickart	115
Killybegs	631	Muff	114
Dungloe	593	Carrick	112
Lifford	478	Malin	112
Stranorlar	462	Culdaff	95
Ardara	442	Ballindrait	91
Rathmullan	402	Laghy	85
Dunfanaghy	386		
Milford	377		
Castlefin	374		
Convoy	369		
Glenties	360		
Mountcharles ...	313		
Ballintra	287		
St. Johnston	272		
Pettigo (pt.) (a) ...	251		
Dunkineely	235		
Newtown Cunningham	207		

(a) The remainder of the town of Pettigo is in District Electoral Division of Clonelly, Fermanagh County.

VITAL STATISTICS.

1.	Population	142,310.
2.	Number of Births	2,629
	Rate per 1,000 of the Population	18.5
3.	Number of Marriages	712
	Rate per 1,000 of the Population	5.0
4.	Number of Deaths from all causes	2,070
	Rate per 1,000 of the Population	14.5
5.	Number of Deaths from Tuberculosis (all forms)	147
	Rate per 1,000 of the Population	1.0

6. Number of Deaths from Pulmonary Tuberculosis	108
Rate per 1,000 of the Population	0.8
7. Number of Deaths from other forms of Tuberculosis	39
Rate per 1,000 of the Population	0.3
8. Number of Deaths from Influenza	91
Rate per 1,000 of the Population	0.6
9. Number of Deaths from Cancer	170
Rate per 1,000 of the Population	1.2
10. Number of Deaths of Infants under 1 year	130
Rate per 1,000 Births	49
11. Number of Deaths from Principal Epidemic Diseases*	26
Rate per 1,000 of the Population	0.2
12. Number of Deaths from Diarrhoea and Enteritis in Children under 2 years of age	4
13. Number of Successful Primary Vaccinations	1,725
14. Number of Deaths from Puerperal Sepsis	—
15. Number of Deaths from other Puerperal Conditions	3
Rate per 1,000 Births	1.1
16. Uncertified Deaths	623
Percentage of total Deaths	30
17. Number of Deaths of persons over 65 years	1.171
Percentage of total Deaths	56.5

(Death Rates are calculated on the population figures according to the Census of 1936 revised).

*Principal Epidemic Diseases :—Enteric Fever, typhus, smallpox, scarlet fever, whooping-cough, diphtheria, dysentery and diarrhoeal diseases.

NOTIFIABLE DISEASES.

The Infectious Disease (Notification) Act, 1889.

Small-pox, Cholera, Diphtheria Membranous Croup, Erysipelas the disease known as Scarlatina or Scarlet Fever, and the fevers known by any of the following names :—Typhus Typhoid, Enteric. Relapsing, Continued, or Puerperal, and also any infectious disease to which the Act has been applied by the Sanitary Authority in manner provided by the Act.

Public Health (Infectious Diseases) Regulations, 1929

Acute Primary Pneumonia or Acute Influenzal Pneumonia, or Malaria or Dysentery.

INFECTIOUS DISEASES

The Infectious Diseases notified during the year 1940 are classified in the accompanying Table, opposite the Dispensary Districts in which they occurred :—

DISPENSARY DISTRICT.	Tuberculosis	Typhus Fever	Enteric Fever	Diphtheria	Scarlet Fever	Puerperal Fever
Ardara ...	7	—	—	—	—	—
Ballintra ...	1	—	—	—	—	—
Ballyshannon ...	5	—	—	—	1	—
Buncrana ...	5	—	—	—	1	—
Carndonagh ...	—	—	—	2	—	
Carrick ...	2	—	—	1	5	—
Castlefin ...	5	—	—	—	—	—
Churchill ...	1	—	1	—	2	—
Cloghan ...	7	—	—	1	10	—
Clonmany ...	—	—	—	6	—	—
Cross Roads (Falcarragh) ...	2	—	—	1	2	—
Cross Roads (Bunbeg) ...	—	—	—	—	3	—
Donegal ...	4	—	1	—	2	—
Doochary ...	1	—	—	—	—	—
Dunfanaghy ...	—	—	2	1	—	—
Dungloe No. 1. ...	1	—	—	—	—	—
Dungloe (Burtonport) ...	8	—	—	1	1	—
Dungloe (Arranmore) ...	2	—	—	2	1	—
Dunkineely ...	—	—	1	1	7	—
Fanad ...	2	—	—	—	1	—
Glenties ...	1	1	—	—	—	1
Kilderry ...	3	—	—	1	2	—
*Killea ...	—	—	—	3	—	—
Killybegs ...	5	—	—	—	—	—
Killygordon ...	3	—	—	—	2	—
Kilmacrenan and Milford ...	—	—	—	4	1	—
Laghey ...	—	1	—	—	—	—
Letterkenny ...	2	1	2	—	3	—
Malin ...	1	—	—	3	—	—
Manorcunningham ...	1	—	—	—	1	—
Moville ...	2	—	1	—	9	—
Pettigo ...	2	—	—	—	7	—
Ramelton ...	—	—	—	—	—	—
Raphoe ...	3	—	—	—	1	—
Rathmullan ...	2	—	1	—	—	—
Rosguill ...	1	—	—	2	—	—
Stranorlar ...	—	1	1	—	4	—
Tanatallon ...	2	8	—	—	1	—
TOTAL ...	81	12	10	29	67	1

* 1 case of Undulant Fever occurred in Killea District.

DIPHTHERIA.

The total number notified was 29, as against 55 last year. This is a rather substantial reduction, and is possibly due to the fairly large number of children who have been immunised against the disease in this county.

The following table sets out the facts as regards immunisation in these twenty-nine cases :—

Year 1940	Immunised	Not Immunised
Total Number of Cases ...	3	26
Total Number of Deaths	Nil	4

It will be noted that no deaths occurred in the three patients who had been immunised against diphtheria. The mortality in the non-immunised was 15.5%—a high penalty to pay for neglect of this procedure. These facts, even in such a small series of cases, speak for themselves, and should need no further elaboration.

The following table, showing the age incidence, demonstrates the manner in which this disease exacts its toll from young children. It is a malady of infancy and childhood, but even when it attacks adults, it still has lethal powers. One of the two adult deaths occurred in a shipwrecked Norwegian sailor, who had been complaining of his throat before his ship was sunk. He was exposed in an open boat for two days before reaching land.

AGE INCIDENCE OF DIPHTHERIA

Age.	Number of Cases	Deaths
0—1	Nil.	
1—3	5	—
3—5	10	2
5—10	1	—
10—15	5	—
15—20	3	1
20—30	4	—
30—	1	1

SCARLET FEVER.

As emphasised in previous reports the incidence of scarlet fever is difficult to determine, as many cases are undoubtedly not notified, either owing to their mild character, or because no doctor is called in. Nevertheless this is a treacherous disease, not to be taken lightly. Cases occur from time to time that show all the symptoms of a virulent infection, and the victims succumb rapidly in spite of treatment. If only for this reason alone, the disease must be treated with respect, although many cases may be of a mild character.

Outstanding points with regard to control of the infection are outlined herewith :—

1. **Infectious Agent.** Streptococcus pyogenes (haemolytic streptococci).

2. **Source of Infection.** Discharges from the nose, throat, ears, abscesses or wound surfaces, and articles freshly soiled therewith. The nose and throat discharges of carriers may also spread the disease

3. **Mode of Transmission.** By droplet spread from an infected person, or by direct contact with infectious discharges, or indirectly by articles freshly soiled with discharges of an infected person or through contaminated milk, or milk products.

4. **Incubation Period.** One to seven days, usually two to four days.

5. **Period of Communicability.** Four weeks from the onset of the disease, or longer if abnormal open sores or wounds are present. Cases of surgical scarlet fever are non-infectious when wounds have healed and discharges cease.

6. **Methods of Control.**

(a) The affected individual and his environment :—

(1) **Recognition of the disease.** By clinical symptoms. In doubtful cases additional information can be obtained by Dick testing, swabbing for haemolytic streptococci, (which may also be typed) and the Schultz-Charlton blanching test.

(2) **Isolation.** In home or hospital, maintained in each case until the end of the period of infectivity.

(3) **Immunisation.** Exposed susceptibles as determined by the Dick test may be actively immunised by scarlet fever toxin.

(4) **Quarantine.** None.

(5) **Concurrent disinfection.** Of discharges from the nose and throat of the patient and articles soiled by such discharges.

(6) **Terminal disinfection.** Thorough cleaning.

(a) **General measures :—**

(1) Daily examination of exposed children and of other possibly exposed persons for a week after last exposure.

(2) Schools should not be closed where daily observation of the children by a physician or nurse can be provided for.

(3) In school and institutional outbreaks, immunisation of all exposed children with scarlet fever toxin may be advisable.

(4) Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.

(5) Pasteurisation of milk supply. Exclusion of known contacts or carriers from handling milk.

7. Pupils may return to school in four weeks from the date of the appearance of the rash, provided convalescence is completed, and there is no sore throat, DISCHARGE FROM THE EAR OR NOSE, suppurating or recently enlarged glands, or eczematous patches. Desquamation (peeling) per se, may be disregarded.

The following is a summary of an important lecture given by Professor Hobson, Oxford, in 1938 :—

We must recognise that the classical case of Scarlet Fever is but one manifestation of a large group of diseases due to the same infecting agent, and the rash which gave rise to the term "scarlet" is a sign which may be completely absent in many cases. The "scarlet" rash is a sign which occurs only in some individuals infected by the streptococcus.

A Scarlet rash may be present or absent in diseased states strictly comparable in all particulars and due to an infection by the same type of streptococcus. Its appearance depends not upon the portal of entry of the infecting organism, but upon the susceptibility of the infected individual to a rash-producing poison, and the quantity of this poison liberated by the streptococcus.

The appearance of a rash is no guide to the virulence, infectiv-

ity or liability to complications in any given case of infection. Scarlet Fever is, indeed, a term so particular in its application yet so general in its association with a multiplicity of diseased states, that its retention in clinical nomenclature tends to much confusion of thought and action.

Notification of the disease is still technically restricted to those cases of infection by a streptococcus which develop a rash, and the admission of cases to scarlet fever wards of fever hospitals is still reserved for such cases. Cases of the same infection but with no rash are nursed at home, or in the wards of general hospitals.

A clear conception of a specific disease is made even more difficult by the fact that not one type of streptococcus but many types have been isolated, each capable of producing a clinical disease with or without a rash, equally infectious and with identical complications. The immunity which develops after an attack to one type of streptococcus does not necessarily protect against other types so that an individual infected by one type may later be infected by another type, and develop identical symptoms—while in either attack, in neither attack, or in both attacks, a rash may appear.

Streptococcus pyogenes produces many toxins, of which the rash-producing toxin has been most completely investigated and has received an entirely disproportionate amount of attention. We now know

(1) that there are a variety of rash-producing toxins depending upon the type of organism from which they are derived ;

(2) that this toxin is relatively of very small importance in clinical disease ;

(3) that the appearance of a rash is fortuitous, and depends upon the susceptibility of the infected individual and the quantity and quality of the toxin produced by a particular organism.

The Rash.

Sufficient emphasis has already been laid upon the fact that the appearance of a rash as a result of an infection by Streptococcus pyogenes is an inconstant feature of an infection, and in practice we recognise that the action of the toxin upon the vessels of the skin may produce an almost infinite variety of clinical pictures, of which three are sufficiently striking to have acquired the status of clinical entities :—

1. The punctuate rash of classical scarlet fever.
2. The diffuse rash with a well-marked margin characteristic of erysipelas.

3. The rash which appears in the cellulitis due to an infection by "Streptococcus pyogenes."

It must be recognised that we are dealing with highly infectious and contagious diseases, and that they should be so treated whether there be a rash or not.

Spread of infection is by three channels which are, in order of their frequency :—

(1) By droplet infection from the naso-pharyngeal secretions of healthy carriers or infected individuals ;

(2) By contact with such vehicles of infection as feeding utensils, towels, handkerchiefs and by infected swimming-bath waters :

(3) The ingestion of infected milk or cream.

A primary difficulty is the definition of the notifiable condition, and opinions are widely divergent. The term streptococcal fever might be substituted for scarlet fever (with abolition of this term), and made to cover all forms of acute streptococcal infection which in the opinion of the notifying physician require admission to hospital on clinical grounds or for domestic reasons.

The streptococcal infections at the present time account for a higher mortality and an incidence of serious disease far greater than can be attributed to any other infectious disease, and a review of our present practice is long overdue.

The solution of the problem would seem to lie in :—

(1) a better professional education of the public in their homes in the methods of isolating infectious cases of streptococcal infection ;

(2) a free admission of selected cases to fever hospitals, whether there be a rash or not.

TYPHOID FEVER (ENTERIC).

Ten cases were reported with one death. They were fairly evenly spaced over the year as evidenced by the following dates of occurrence :—

Occurrence : 1940			
February	1 case	Female	21 years
April	1 ,,	,,	48 ,,
May	2 ,,	1 Male	38 ,,
		1 Female	11 ,,
August	3 ,,	1 Male	
		2 Females	
October	1 ,,	Female	12 ,,
December	2 ,,	Female	33 ,,
		Male	19 ,,

All the cases gave positive Widal reactions in the blood (one agglutinated B. paratyphosus B and C as well), and no case was discharged from hospital until three consecutive specimens of both faeces and urine had been examined and found not to contain B. typhosus.

In six cases there was no obvious source of infection. Of the remaining four, one was suspected to be due to consumption of tainted oysters from Lough Swilly, and three were very probably infected from carriers.

One of these last three was interesting insofar as a definite carrier was detected by insistence on bacteriological examination of the faeces. In last year's report I mentioned the following :—"Two of the typhoid cases, one of whom died, occurred in brothers who were working on a farm for a few months prior to their illness. On investigation it was discovered that there had been cases of typhoid in the members of the household occupying the farm some eight years previously. Another case in the same district last year was found to have obtained milk from this farm on one occasion. Unfortunately it was not possible to persuade the members of the suspected family to allow of tests being made in order to ascertain if one of them was a carrier. Furthermore, of a party of scouts from Scotland, who were encamped near this farm in 1939, one boy contracted typhoid fever, and it was then ascertained that he had been one of a number who had gone to this particular farm and purchased milk there. He remembered having shaken hands with the farmer's wife prior to his leaving the house.

A further case occurred this year in the same district and it was found on inquiry, that the patient had been supplied with buttermilk daily from the same farm where the two brothers above mentioned had been working last year. In view of this evidence we

insisted this year on obtaining specimens for bacteriological examination from the farmer and his wife, the sole inmates of the house. The farmer's wife was thereupon proved to be an intestinal "carrier," and she it was who dealt solely with the buttermilk sold to the patient. It is an interesting fact that this "carrier" was under the impression that she had never suffered from typhoid though she was aware that several members of her family had had the disease in 1927. She had had a short illness at that time, but never thought it was typhoid fever. It is reasonable to suppose that she has been a "carrier" since 1927—possibly with intermissions. Instructions have been issued to her not to handle any foodstuffs for public distribution, and she has been informed of the special necessity in her case of careful washing of her hands after excretion and before touching food, and also of the great care to be taken in the disinfection and disposal of excreta.

Of the other two cases, one went as a maid to a house where the occupant had had typhoid fever six months previously, and had been proved an intestinal carrier in hospital, where he was kept for some three months before discharge.

The other case occurred in a young man who was a frequent visitor to a neighbouring house. It was found on inquiry that practically all the members of this house had suffered from an illness thought to be "Influenza" some weeks previously. Specimens of the excreta were obtained from all but one of this family and found to be negative.

Not a few people are still to be found at the present day who believe that diseases such as typhoid fever can arise 'de novo'—in a spontaneous manner—despite the fact that the origin and mode of infection are now so well proven. Typhoid fever is due to a specific microbe (Bacillus typhosus) which is present in the discharges of patients and "carriers." Although it is usually a matter of extreme difficulty, and often quite impossible to trace the source of infection, it cannot be too forcibly insisted upon that in every case **there is** a source of infection, even though it cannot be traced. Apart from infection by an actual case of the disease, "carriers" are the all-important source, and it is to be noted that although these "carriers" may be proved non-infective on discharge from hospital, they are unfortunately liable to excrete the organisms intermittently from time to time, especially if they contract any acute intestinal disorder. This discovery is of comparatively recent date, and has helped to clear up the origin of many otherwise mysterious outbreaks.

In the following pages will be found a short account of the efforts of William Budd, a pioneer in this field, to enlighten the ignorance of his fellow-countrymen on the nature of this disease and its deadly power of spread. He found a great deal of opposition to his views, but had the profound satisfaction of finding his theories

verified in almost every particular by succeeeding generations of medical men.

TYPHOID FEVER.

In March, 1872, Dr. William Budd published his classical monograph on "Typhoid Fever, Its Nature, Mode of Spreading and Prevention." He had for over twenty years been waging a vigorous fight for his theory (now well proven) of the contagiousness of the disease, and in his monograph sets forth the very cogent reasons for this belief. His view is summarised in the last four lines of the preface where, referring to some reports on outbreaks of typhoid fever, he says :—"These reports are admirably drawn up and they all offer the most striking illustrations of the twofold position that typhoid fever is a strictly self-propagating fever (mainly) disseminated by the specific discharges from the sick. Goodal ("A Short History of the Epidemic Infectious Diseases") states that the question of the identity or non-identity of typhus and typhoid was not finally settled until 1851, when William Jenner as the result of his investigations at the London Fever Hospital demonstrated conclusively the differences between typhoid, typhus and relapsing fevers. Previous to that date typhoid, typhus and relapsing, and doubtless undulant and other less common acute fevers were all included under the term "continued," a term which is still to be found in the official list of compulsorily notifiable diseases.

Nevertheless, in spite of the work of Jenner in England, and others on the Continent, Budd found sufficient opposition to his views at home in reputable medical circles to constrain him to issue his monograph in 1872. It may be recalled that when on October 12th 1867, William Budd announced in the "Lancet" that, in his opinion, phthisis is a communicable disease and gave reasons for his belief, his statement was received almost with scorn by the profession and his theory was regarded as quite novel ! Since Budd's time, of course, the specific bacteria causing these two diseases have been isolated, and thus Budd's views have been confirmed up to the hilt.

Some extracts from his monograph may be cited as they are still applicable and were based on practical observation of the disease.

"There are few things which concern the people of this country more deeply than to know the exact truth touching the mode in which this fatal fever is disseminated amongst them. Every year, on an average—take the United Kingdom through—some fifteen thousand or more of their number perish prematurely by it ; a population equal to that of a considerable city every year swept into the grave by a single, and as I hope to show, a perfectly preventable plague . . . . . The real amount of suffering involved in this is, however, but feebly represented by these bald figures.

No one can know what they really imply who has not had ex-

perience of this fever in his own home. The dreary and painful night watches—the great length of the period over which the anxiety is extended—the long suspense between hope and fear, and the large number of the cases in which hope is disappointed and the worst fear is at last realised, make up a sum of distress that is scarcely to be found in the history of any other acute disorder. . . . But if this be true of the mansions of the rich who have every means of alleviation which wealth can command, how much more true must it be of the cottages of the poor, who have scant provision even for the necessaries of life, and none for its great emergencies! Here, when Fever once enters, Want soons follows, and Contagion is not slow to add its peculiar bitterness to the trial . . . .

How often have I seen in past days, in the single narrow chamber of the day labourer's cottage, the father in the coffin, the mother in the sick bed in muttering delirium, and nothing to relieve the desolation of the children but the devotion of some poor neighbour who in too many cases paid the penalty of her kindness in becoming, herself the victim of the same disorder!

In its ordinary course, human life has few such consummations of misery as this.

Having been by accident thrown much in the way of this fever, I have long felt that it is impossible to bear a part in the calamities of which it is the source, without becoming possessed with a burning desire to devote the best powers of the mind to the discovery of means by which such calamities may be prevented.

That typhoid fever is a true member of this group (infectious fevers), or in other words that it is, in its essence, a contagious or self-propagating fever, was proved long ago.

It is scarcely to the credit of the medical profession that this great truth should still be disputed, ...

But notwithstanding this there is abundant reason to believe that, in respect of this species of fever, the great majority; not of the laity only, but of the profession also, still remain anti-contagionists. And this, moreover is not only true of the rank and file, but distinguished men, who have gained great credit and wide acceptance as teachers of medical science, are to be found, who appear to lean to the same side.

In the discussions on the cause of typhoid fever which filled so large a space in the public papers, both lay and medical, for many weeks together on a recent memorable occasion, the idea of contagion in connection with the disease was almost universally either

ignored or repudiated . . . . . .

The profession in foreign countries, including the leaders of it, seem still to be equally opposed to the idea that the disease is contagious . . . . . .

This direct opposition of opinion to fact in a matter of such vital importance, and so open to observation, is as perplexing as it is discouraging.

. . . . . In the case before us, methods are not in question at all —the evidence lies on the very surface of common events, and the conclusion to which it tends so far from transcending ordinary apprehension, is often so salient as involuntarily to force itself on the mind, even of the vulgar, on the first view of the facts."

Speaking of some very insanitary and evil smelling premises which he had inspected Budd remarked :—"For the development of this fever a more specific element was needed than either the swine, the dung heaps or the privies were, in the common course of things, able to furnish.

In the course of time as was pretty sure to happen, this element was added, and it was then found that the conditions which had been without power to "generate" the fever, had but too great power in promoting its spread when once the germ of fever had been introduced."

He then gives an example of a primitive community (Loosebeare) which was signally free from the fever till the arrival of a girl with the disease actually upon her. "Before that event, in spite of manure heaps, pig-styes and the like, Loosebeare was free of the malady. The diseased intestines of the infected girl continued to deposit their morbid excreta upon the soil for a fortnight or more before the fever began to spread, and the first cases that succeeded to hers sprang up immediately around her person." "The existence here "as in the other contagious fevers," of a latent period after the occurrence of infection ; the exemption conferred by one attack against any future attack ; and lastly the immunity of numbers of persons who, though freely exposed to the fever poison, yet remain proof against it—are characteristics of which the significance cannot be doubtful."

"Now, I have no difficulty in giving my opinion that **all** the emanations from the sick are in a certain degree infectious. At the same time it is one of the principal objects of this work to show that what is cast off from the diseased intestine is incomparably more virulent than anything else."

"The power of the sanitary arrangements just referred to, in almost infallibly preventing the spread of a fever which, in their

absence, often strikes down several members of a family in succession in spite of the presence of every other favourable sanitary condition, seems to show, with a force of evidence that is irresistible, that while this fever is an essentially contagious fever, the contagious element by which it is mainly propagated is contained in the specific discharges from the diseased intestine. . . . . These discharges contain matters on which the fever poison has set its seal in the most consummate fashion. Wherever they travel, there, at least the most specific exuviae from the sick body are in operation. **The sewer, which is the common receptacle, is, so to speak, the direct continuation of the diseased intestine."**

Alluding to the well-known typhoid ulcers found in the intestines of people dying from the disease, Budd says: "Take the diseased intestine away, and it becomes impossible, in a common outward survey at least, to distinguish the body of a man dead from typhoid fever from that of a man killed by many another septic poison; take away the body, but leave the intestine, and by the marks upon it, death from this fever is at once distinguished from death from any other cause." . . . . . .

"We come then to this that every year in this kingdom, at least, 100,000 human intestines diseased in the way which I have attempted to characterize continue, each for the space of a fortnight or thereabouts, to discharge upon the ground, floods of liquid charged with matters on which the specific poison of a contagious fever has set its most specific mark. This is not a theory, but the bare statement of a fact. It is the fact of facts in its bearing on the present investigation. To obtain an adequate conception of the magnitude of the provisions thus made for the work of dissemination, we must remember how infinitesimally small a dose of the poison thus deposited is sufficient to reproduce the fever, and how vast is the multiplication which, according to all reasonable calculation, this poison undergoes in every individual case. If the main conclusion we have come to in this chapter be just the great bulk of this multiplication is represented by the intestinal discharges . . . . If these calculations be well founded, one thing at least is clear—that a disease which is endowed with such vast provisions for the continuation of its species is not likely to die out for lack of heirs."

Assuming the intestinal discharges to have the principal hand in the dissemination of the fever, we come at once, then, to the following deductions:

1st. That, as a rule, this fever will spread the more, the less perfect the provisions for preventing the discharges from the human intestine from contaminating the soil and air of the inhabited area.

2nd. That where these provisions fulfil this end, the disease will show little or no contagious power.

3rd. That its tendency to run through families will oftenest take effect where there is only a common privy ; least often where there is a well-appointed water-closet. That this tendency will be observed very commonly, therefore, in country places, and comparatively rarely amongst the wealthy inhabitants of large towns.

4th. That, generally speaking, the distribution of the disease will be different in country and in town ; that in the country, where there are few or no sewers, and where, consequently, the intestinal discharges accumulate around the infected dwelling, the disease will occur in a thickly clustered manner ; that in the town, where these discharges are conveyed, often from long distances, by sewers, the ramifications of which extend through large communities, it will appear in a more scattered form.

5th. That, as what the sewer receives from the fever patient is incomparably more virulent than anything else thrown off by him, the infection (until the true interpretation of the events be known) will appear, for the most part, as if it had its source in the sewer, and not in the already infected man.

6th. That in the country, the contagious nature of the fever will be obvious and unmistakable ; but that in the town, it will most commonly be masked and obscure.

7th. That in the former, the fever will be epidemic and thickly clustered ; in the latter, as a rule, endemic and scattered.

8th. That separation of the healthy from the infected will be of no avail to prevent the spread of the fever, unless it include separation from the intestinal discharges also.

9th. That, for this reason, the severest outbreaks will be seen in schools, barracks, and other large establishments, where a single common privy is often, alike, the receptable of the discharges from the sick, and the daily resort of large numbers of healthy persons.

To appreciate the full strength of the case, we must bear in mind that, with the exception of what relates to season and place, all that is here enunciated is elicited, not from observation of the events as they really occur, but as the result of pure deduction from the twofold assumption—that intestinal fever is contagious, and that the intestinal discharges contain the most virulent part of the poison by which the contagion takes effect.

These nine propositions embody, not the result of experience but the anticipations of theory. If experience and theory happen in

this case to offer an exact coincidence, is it not because the one is in reality the true expression of the other ?

Dr. Murchison, whose book on the "Continued Fevers" is a classic, investigated an outbreak of typhoid at Windsor in 1858, and following the belief of those opposed to Budd, came to the conclusion :—" That the fever was due to the emanations from the sewers (i.e. sewer-gas) was the undisputed opinion of all who investigated the circumstances." **This theory is now known to be altogether wrong,** but unfortunately the superstition still lingers, especially in rural districts. Murchison was a great clinican, but went astray in his theory like many other eminent men of his time. Even Budd was slightly shaken by this pronouncement from such an authority, and haltingly admitted that it could perhaps happen, but he absolutely refused to subscribe to the stupid doctrine that such infection could arise from the poison generated by putrescent animal matter. He strongly maintained, and modern science has fully vindicated him in this, that the poisonous matter must be **put into** the sewer (by diseased intestinal discharges) before the sewer contents can be contagious. He demonstrates this as follows :—

"During the very period when the Windsor epidemic was at its height, I was in the habit of visiting several thickly peopled courts in Bristol where the atmosphere of the houses was charged with sewer effluvia to a degree that would not be endured for a day, except by persons who were bound by the iron chain of poverty to a fixed spot. And yet all the while, in not one of these courts did a single case of fever arise. Hundreds of other medical practitioners, could, I doubt not, bear the like testimony."

Speaking later of the precautions which should be taken he says :—" At present the great bulk of what escapes from the intestines of fever patients in this and other countries is, too often, let loose upon society without the slightest precautions being taken, and we see with what results. I trust the time is not far distant when to allow these matters to pass into the cesspool or sewer, in full possession of their deadly properties will be looked upon, not merely as a careless, but as a highly culpable act."

Budd investigated another typhoid outbreak in a public school in the south of England. On the strength of the general experience in such matters, the state of the common latrine, which was very defective and highly offensive, was at once fixed upon as a sufficient explanation of the calamity. "As the boys who took the fever **were separated from the rest the moment they fell ill,** the operation of contagion was supposed to be entirely excluded, and the case was **accordingly quoted** at the time, not only as opposed to contagionist

views, but as a flagrant illustration of fever on a large scale caused by miasmata actually generated in a common sewer. But a closer scrutiny was fatal to this view of the case. In the first place the sewer, although sufficiently offensive, was in no worse state than it had been for many months before, during the whole of which time no single case of fever had occurred. That what had been so long harmless should have become suddenly so deadly, of itself implied the introduction of some new element . . . . . I ascertained on inquiry that **the intestinal discharges from the fever patients still found their way to the common receptacle** . . . . . Looking at the facts as a whole, therefore, and in the light of other evidence, the conclusion seemed to be irresistible that the tainted latrine, to which everything pointed as the chief agent in spreading the fever, gave the disorder, not because it was exhaling pythogenic or putrescent compounds, but because it had become impregnated with the actual fever poison."

"One mode of communication has attracted little attention which it is important nevertheless not to overlook ; I speak of the tainted hands of those who wait on the sick. Among the poor, and in ways that will suggest themselves, and need not be particularly described, there is reason to believe that this mode often has a large share in spreading the disease through the family circle. Passing from the hand to other things under contingencies that are not only very conceivable, but are sure now and then to occur, the contagion thus arising may sometimes have a much wider scope. I possess evidence which renders it in the highest degree probable that milk and butter, especially, may become infected in this way.

Linen, wearing apparel, bedding and other porous fabrics, tainted with fever (i.e., with intestinal and kidney discharges), constitute another important form of vehicle

But the evil does not terminate here. The clothes and linen, **especially of those who die,** are impregnated with contagion, and servants who visit their friends or acquaintances during the fever, and more particularly those who buy articles of linen or apparel from pawnbrokers may introduce the infection without suspicion into the families of the affluent."

He gives another instance of a nurse who mysteriously developed typhoid. It transpired, however, on investigation that some weeks previously she had nursed a sick child on her lap and, as there was severe diarrhoea, it was more than probable that her clothes had become soiled with the specific excreta.

Speaking of this and other proved instances of infection by tainted clothing, Budd remarks :—"The minute and impalpable agent which gave the fever in the cases just referred to, had had no commerce with drains, and was perfectly innocent of sewer gas. It had entirely escaped that mysterious concoction which is supposed to occur only in the drain, and which is held to be essential to the

production of this particular type of contagion." Later he makes the very wise deduction :—" I have no doubt that, if all milk were boiled before being used, a marked diminution in the prevalence of ' more than one' (the italics are mine) very serious type of disease would soon follow."

Of prevention : "In carrying out a system of prevention, two great principles should be kept in view. The first is to be lavish in the use of disinfectants rather than to run the terrible risk of failing by default ; the second, that whatever be done, should be done in that thorough and conscientious way which alone befits acts that may issue in health or disease, in life or death, to indefinite numbers of men."

He instances a case where no proper precautions were taken (with dire results) because the fever was held to be due to bad drainage only and not in any way catching. "How much longer," he asks, "will these dangerous delusions continue to prevail ?" . . . . . By the public at large at any rate, organic matters, and especially sewage in a state of decomposition, without any relation to antecedent fever, is still generally supposed to be its most fertile source." Budd was determined to expose the falsity of this view, though, as he remarks very truly : When a theory of this sort has once become widely current, no rival theory (unless it be within the circle of the exact sciences) has, for a time at least, any chance of a fair hearing. Nevertheless village life, not only in England but in Europe generally is constantly presenting to us the following conditions :—

1. Sewerage entirely wanting or very defective ; and the resulting putrescent compounds rife in proportion.

2. Typhoid fever wholly absent for long periods of time, notwithstanding.

3. Great virulence and inordinate spread of the fever when imported by reason of, and in proportion to, the defective sewerage.

The long continued and entire immunity from the disease amid the impurities to which it is commonly ascribed, especially when contrasted with its intense virulence when once introduced, shows, with a force of evidence which in medical problems is rare indeed, that these impurities have no power of themselves to cause fever, but only when, as the course of events, they happen to become charged with its specific poison."

" To conclude on the evidence usually assigned for such a belief that a poison of whose growth this is the history, is bred in every cesspool or ditch in which there may chance to be a heap of seething rottenness, is precisely on a par with the philosophy which led the

ancients to believe that mushrooms are bred of cow-dung, alligators of the mud of the Nile, and that bees, as Virgil sang, may be engendered in the entrails of a putrid ox. And signs are not wanting to show that the time is not far distant when the belief in question will take its place in that limbo of discarded fallacies to which these other superstitions have long been consigned.

While, therefore, the great fact remains that sewers are the principal channels through which this fever is propagated, the proof from all sides is overwhelming that they are not so because of their being receptacles of decomposing organic matter, but solely because of their being the depositaries of the specific discharges of persons already infected . . . . .

"So completely indeed, in the public mind is this fever identified with sewer poisoning, and so insignificant, in comparison has seemed the part which mere personal intercourse has taken in its propagation, that the sewer has come to be looked upon as the actual and primary source of the disease while the infected man has been altogether lost sight of . . . . . Even scientific men have failed to discern the great truth that the sewer only owes its fatal influence to its connection with men ; that it is but the channel for the distribution of a poison which it has no power to generate, and only acts in the work of dissemination by opening a wider sphere to the contagious principle . . . . . .

With the exception of what relates to defective sewerage—a case already disposed of — the only plea for believing in the spontaneous origin of this fever is founded on evidence of a purely **negative character**, and consists solely in our inability to trace, with the eye the continuity of a chain whose links are known to be invisible. To conclude from this that no chain exists is palpably absurd."

Budd winds up with this appeal to "the people of this Kingdom": "To spare from this hour no human effort to put under foot this great enemy of man. And let no one suppose that this is a matter in which he has no personal interest. The duty itself we may evade, but we can never be sure of evading the penalties of its neglect. This disease not seldom attacks the rich, but it thrives most among the poor. But, by reason of our common humanity we are all, whether rich or poor, more nearly related here than we are apt to think. The members of the great human family are in fact, bound together by a thousand secret ties, of whose existence the world in general little dreams.

And he that was never yet connected with his poorer neighbour by deed of charity or love, may one day find, when it is too late that he is connected with him by a bond which may bring them both, at once, to a common grave."

When we contemplate the fog of doubt and prejudice with which Budd was confronted, and the myriad clouds of strange and nonsensical doctrines held by even eminent medical men of his time, one needs must feel a thrill of pride in this country practitioner, aided by his stout commonsense dourly battling to dispel both fog and clouds, and marshalling his evidence in such a logical and masterly way, that he finally won through to victory, despite the opposition of practically the whole medical profession of his day.

His feat is all the more remarkable when we reflect that: (1) He did not know the cause of typhoid fever. (2) He was not aware of the existence of "carriers" though he had his suspicions. This last knowledge would have made perfectly clear the persistence with which outbreaks occurred in the same district from time to time, where outside influences could positively be excluded. These puzzled him, as he frankly admitted, but fortunately they were not sufficient to divert him from his general theory of contagion, which he proved over and over again in different epidemics.

(3) He did not apparently suspect that the kidney discharges also contained the specific germ of typhoid.

May I again repeat in the light of the above: "The single important source of enteric infection consists in typhoid (or paratyphoid) bacilli which are living or proliferating within the bodies of infected persons; and the whole problem of prevention, neglecting for the moment the possibility of active immunisation consists in stopping the various routes by which the bacilli may pass from the intestine or kidney of one individual to the mouth of another."

Finally we give herewith the sound practical rules drawn up by Budd for general use in his own day, and printed as an appendix to his book :—

RULES FOR PREVENTING THE SPREAD OF TYPHOID FEVER, DRAWN UP FOR POPULAR USE.

How Typhoid Fever (otherwise called Gastric Fever, or Low Fever) may be prevented from spreading.

The means by which typhoid fever may be prevented from spreading are very simple, very sure, and their cost next to nothing.

They are founded on the discovery that the poison by which this fever spreads is almost entirely contained in the discharges from the bowels.

These discharges infect—1. The bed and body linen of the patient. 2. The privy and cesspool; or the drains proceeding from them.

From the privy or drain the poison often soaks into the well, and infects the drinking water. This last, when it happens, is of all forms of fever poisoning the most deadly.

In these various ways the infection proceeding from the bowel discharges often spreads the fever far and wide.

The one great thing to aim at, therefore, is to disinfect these discharges on their very escape from the body, and before they are carried from the sick room.

This may be perfectly done by the use of disinfectants—one of the best is made of green copperas. This substance, which is used by all shoemakers, is very cheap and may be had everywhere. A pound and a half of green copperas to a gallon of water is the proper strength. A teacupful of this liquid put into the night-pan every time before it is used by the patient, renders the bowel discharge perfectly harmless.'

[1]As the discharge is sometimes much more copious than at others, the quantity of disinfectant added must, of course, be copious in the same proportion. A teacupful is mentioned in the rules, but the principal is to be lavish of the chemical. One part of Calvert's liquid carbolic acid in fifty parts of water is equally efficacious.

To disinfect the bed, and body linen, and bedding generally, chloride of lime, or MacDougall's or Calvert's Powder, is more convenient. These powders should be sprinkled, by means of a common dredger, on soiled spots on the linen, and about the room, to purify the air.

All articles of bed and body linen should be plunged, immediately on their removal from the bed, into a bucket of water containing a tablespoonful of chloride of lime, or MacDougall's or Calvert's Powder, and should be boiled before being washed. A yard of thin wide gutta percha placed beneath the blanket, under the breech of the patient, by effectually preventing the discharges from soaking into the bed, is a great additional safeguard.

The privy, or closet, and all drain communications with it should be flushed twice daily with the green copperas liquid, or with carbolic acid, diluted with water.

In towns and villages where the fever is already prevalent the last rule should be put in force for all houses, whether there be fever in them or not, and for all public drains.

In the event of death, the body should be placed, as soon as

possible, in a coffin sprinkled with disinfectants. Early burial is, on all accounts, desirable.

As the hands of those attending on the sick often become unavoidably soiled by the discharges from the bowel, they should be frequently washed.

The sick room should be kept well ventilated day and night.

The greatest possible care should be taken with regard to the drinking water. Where there is the slightest risk of its having become tainted with fever poison, water should be got from a pure source, or should, at least, be boiled before being drunk. Immediately after the illness is over, whether ending in death or in recovery, the dresses worn by the nurses should be washed or destroyed, and the bed and room occupied by the sick should be thoroughly disinfected.

These are golden rules. Where they are neglected the fever may become a deadly scourge ; where they are strictly carried out, it seldom spreads beyond the person first attacked.

WILLIAM BUDD, M.D. [2]

[2]Anyone who may desire to reprint these Rules for general use has the full permission of the writer to do so.

TYPHUS.

An outbreak of typhoid fever, comprising twelve proved cases, occurred in May-June, 1940, with one death. Eleven of the cases gave the Weil-Felix reaction in diagnostic titre, but there were two further negative cases who had recovered from their illness before the test could be performed. There was little doubt from the clinical history that they had suffered from genuine typhus. All were of the vagrant class with the exception of one case, and all were proved to have been in close contact except this one case. It is presumed that he was a casual (if unwitting) contact, as the opportunity existed for such contact. Seven of the cases occurred in one family of tinkers, who apparently initiated the epidemic.

The following table gives a summary of the twelve cases treated

TYPHUS CASES — COUNTY DONEGAL OUTBREAK — 1940

Name.	Sex.	Age.	Occupation	Date of Onset.	Date first seen.	Date Admitted to Hospital	Date Discharged.	Bacteriological Test (Weil-Felix)	History of Contact
K.McG.	M.	27	—	16/5/1940	17/5/1940	25/5/1940	28/5/1940 (Died)	P.I/5,000	Casual Contact of S.
M.S.	M.	18	Tinker	16/5/1940	24/5/1940	25/5/1940	21/6/1940	P.I/1,000	Yes
T.S.	M.	14	Tinker	June, 1940	9/6/1940	9/6/1940	13/7/1940	P.I/2,500	Yes
M.S.	F.	10	Tinker	May, 1940	9/6/1940	9/6/1940	23/6/1940	P.I/50	Yes
A.S.	F.	7.	Tinker	May, 1940	9/6/1940	9/6/1940	23/6/1940	P.I/200	Yes
E.S.	M.	3	Tinker	May, 1940	9/6/1940	9/6/1940	21/6/1940	Negative	Mother ?
P.S.	M.	$1\frac{8}{12}$	Tinker	May, 1940	9/6/1940	9/6/1940	21/6/1940	Negative	Yes
J.S.	M.	38	Tinker	June, 1940	11/6/1940	11/6/1940	13/7/1940	P.I/2,500	Yes
R.F.	M.	$2\frac{3}{4}$	—	June, 1940	18/6/1940	18/6/1940	23/7/1940	P.I/200	Yes
D.F.	M.	22	Vagrant class.	15/6/1940	20/6/1940	20/6/1940	23/7/1940	P.I/2,500	Yes
E.K.	M.	15	Vagrant class.	June, 1940	21/6/1940	21/6/1940	23/7/1940	P.I/5,000	Yes
B.M.	F.	8	Tinker	16/5/1940	24/6/1940	24/6/1940	27/7/1940	P.I/1,000	Yes
P.D.	M.	40	Fiddler	15/6/1940	26/6/1940	26/6/1940	27/7/1940	P.I/5,000	Yes
B.McG.	M.	24	Tinker	July, 1940	31/7/1940	1/8/1940	30/8/1940	P.I/1,000	Probably Yes

(P.=positive).

In last year's report I discussed a suspected case of typhus fever, and was of opinion that there was not unequivocal evidence available to prove that the case was actually typhus. I went on to make the following remark :—"It is heartening to record that typhus is now practically extinct in Ireland. So much so, that the majority of my generation, including myself, have never seen a genuine case."

Well that statement now no longer holds, as we experienced the above-mentioned short, fairly well circumscribed epidemic (12 cases) in 1940, fortunately with no further known extensions to date (March 1941).

As will be evident from the sequel it was most fortunate, from the epidemiological point of view, that the first patient to come under our notice had developed a typical rash towards the end of his fatal illness, thus arousing suspicion as to the nature of his malady. This was confirmed by a blood agglutination test to be typhus fever.

The first intimation received by the Public Health Department of the county was a telephone message (during my absence in Buncrana) to the effect that there was a typhus patient, M.K., in Letterkenny Hospital, and that if I wished to see him alive, I should go and see him without delay. Accordingly on my return that evening, I went to Letterkenny and saw the patient. He died during the course of the next day.

The following report was very kindly supplied by a consultant who had seen the patient before his removal to hospital :—

"I saw this patient in consultation on 25/5/1940. This was a Saturday, and the history given to me was that the onset of this youth's illness (age 27 years) apparently took place during the previous week-end, i.e., 18th/19th May. There was a great deal of vagueness about the history, and apparently there were no very typical symptoms except general malaise and a severe headache. A peculiar point which may have some diagnostic significance was that, during this week, he apparently had some cerebral irritation and was quarrelsome, much in the same manner, it appears, as a person who might be intoxicated. The temperature rose steadily all week though not typical of anything. Pulse was rapid and thin. The tongue was dirty, but there was no splenic enlargement. No rash was visible."

"When I saw M. K. late on 25/5/1940, my first impression was 'septicaemia.' He was obviously a very sick man, but was in possession of his faculties. His eyes were dull and heavy, but there was no conjunctival injection. I did not notice any peculiar odour, and there was no rash visible. The skin was moist, but there was no profuse perspiration. Physical examination revealed really nothing of importance. One felt that his heart was not standing up to it very well, and there were a few moist sounds at the bases of

both lungs. Nothing was made out by abdominal examination. To sum up, there was very evident and obvious prostration, but beyond noting that, one felt that by clinical examination one was no further on towards the elucidation of his complaint.

The following serological and other clinical pathological examinations were carried out :—

Blood Culture.	Proved completely sterile.
Agglutination Tests.	B. typhosus — Negative.
	B. paratyphosus A. do.
	B. paratyphosus B. do
	Bruc. abortus do
	Haemoglobin 84 per cent.
Blood Count.	Red Cells 5,600,000 per cmm.
	White cells 13,200 per cmm.
Urine.	Highly coloured. Albumen present. No blood cells. No pus cells. No casts seen.

" The next day the patient's doctor 'phoned me and suggested that if I had any serum left I should do a Weil-Felix test as, in the meantime, a dusky rash had appeared on the patient's chest. I did so and got a positive reaction to a titre of 1/1,000. On reporting this to his doctor, I asked him for a further sample of blood for confirmation. This sample yielded a positive titre of 1/2,500. In view of the importance of making quite sure from a public health point of view I asked Professor Wilson of Queen's University, Belfast, to test the blood—in his hands a positive titre of 1/2,000 was obtained."

At this time the consultant thought that this was possibly a sporadc case of Tick or Flea typhus, probably carried by a dog or cat—a reasonable supposition, as the patient came from a first-class home, and there was no evidence whatever of louse infestation.

" I saw the patient on 27/5/'40 and made the following rough notes :—

CASE REPORT.

" M. K. Age 27 years. Occupation—Nil.

History : Headache since 17/5/'40. Felt weak and shivering on 16/5/'40. Not far away from his home for months. Faint rash noticed by doctor on 23/5/'40. Didn't pay much attention to it at the time. Patient felt peculiar on 16/5/'40, stayed in bed on 17th (Friday). Got up on Saturday and went to Confession. In bed on Sunday with violent headache, which lasted four days, and then went away. Had a sharp bout of epistaxis.

Family History : Father, mother and sister at home. No recent illnesses. All well. Patient had never done any work.

Examination: Breathing very rapid. No cough. No spit. Eyelids partly closed. Nurse says patient seems to have slight difficulty in swallowing—holds food or drink in mouth before swallowing. Nurse says rash came out fully this morning (27/5/'40). Patient has been having Prontosil.

Temperature (axilla) 102.5 degrees. Pulse 144. Respirations 44.

Small faded petechial rash all over—on hands, feet, body and neck. Spots do not fade on pressure. No central punctuation of spots . There are also some small raised purplish blotches.

Knee-jerks absent.
Ankle-jerks absent.
Abdominal reflexes absent.

Marked withdrawal of root on plantar stimulation. Patient incontinent of urine and faeces. No reflexes obtainable in arms. No neck rigidity. No pain on flexing neck. Eyes not injected. Pupils slightly contracted and equal—reacted to light. Could protrude tongue only partially (just the tip). Tongue coated with yellow fur, sides red and moist (as far as visible). Said he felt slight sore throat yesterday. Showed his teeth when asked. Could whistle. Kept eyelids closed poorly against pressure.

Patient was quite rational but very weak. (Had to be turned over on his side by nurse and myself). Nothing abnormal detected in lungs, except some moist rules at both bases. No rigidity in abdomen. Spleen and liver not palpable

Appearance of Patient: Lay on his back. Eyes tended to close opened only with an effort. Mouth hung partly open. He had the expression of a drunken man. Rash covered his back as well as front of body. Answered questions intelligently when roused. Breathing very rapid.

DIED on 28/5/1940.

Pathological Findings.

1st sample	(1)	Weil-Felix positive	1/250, this went up later to
of blood.	(2)	„ „	1/1,000.
2nd sample	(3)	„ „	1/5,000 (sample of blood on morning of 28/5/40).

Widal and blood-culture negative.

Weil-Felix confirmed by Professor Wilson, Belfast University.

As already mentioned this patient had the misfortune to succumb to his malady. His was the only death in this epidemic.

Weil-Felix Test. It is perhaps worth recalling that Professor Wilson, Belfast, who confirmed the positive Weil-Felix test on the blood was the pioneer in this important aid to diagnosis. The reaction consists of agglutination or clumping of "Bacillus proteus x 19" (obtained from the urine of cases of typhus) by the blood-serum of typhus fever cases in dilutions of 1/100—1/2,000 or higher, and was described by Weil and Felix in 1916 (as a result of their work in Eastern Galicia). Wilson, however, had, in 1910, isolated from the faeces of one case, and from the urine of two cases a variant form of "B coli communis which was agglutinated by the serum of seventeen cases of typhus, and not by normal serum. Thus he paved the way for the further experiments of the two continental workers. A large amount of additional experimental work since 1916 has demonstrated that the Weil-Felix reaction occurs in 99-100 per cent. of typhus cases. About 50 per cent. of the cases gave a positive reaction by the fifth day, and practically all by the tenth day of the disease, sometimes in dilutions of the serum as high as 1-30,000. Even though it is generally held that the reaction is not specific, insofar as "B proteus x 19" cannot be identified as the cause of the disease, its value as an aid to diagnosis is extremely high, and may be said to be as important in the diagnosis of typhus as the Widal test is in typhoid. A titre of 1 in 200 is usually considered diagnostic.

As a result of hearing of this case suspicion was aroused in the case of a youth of the tinker class who had been in Donegal Fever Hospital for some two weeks, having recovered from an indefinite illness. The following are the facts noted regarding this patient :—

Name :—M. S. Address :—Tinker class. Age :—19 years.

He was admitted to Donegal Fever Hospital on 25/5/1940 suffering from headache and general weakness. He had been ill nine days before admission, and was sent in to hospital from Glenties as a possible case of typhoid fever. Temperature on admission was 105 degrees, Pulse 120. He had a hard cough most of the time and some bronchial wheezing. His clothing is said to have been very clean—no body-lice. There were a few lice in his hair, not many. His skin, however, bore scratch-marks and was flea-bitten.

He complained of very severe headache, had a peculiar greyish pallor, and a very perceptible and disagreeable straw-like odour. He was much troubled with a hacking cough, was very delirious night and day, and continued to be so until June 1st, when the cough eased and he slept quietly for the first time since his admission to hospital. His improvement was maintained and he was discharged from hospital quite well on 21/6/1940. Owing to the fact that he had no perceptible rash, typhus was not thought of, and as the Widal test for typhoid was negative on the twelfth day of his illness he would in all probability have been discharged as "pyrexia of unknown origin" were it not for the diagnosis of typhus fever having

been made meantime in the Letterkenny case. In view of the latter, a sample of his blood was sent for examination on June 7th, and it was found to be positive (Weil-Felix 1/1,000).

I saw this patient on 3/6/1940 for the first time, during a routine inspection of the hospital. His temperature and pulse at this time were normal, and he felt fairly well, though he still had a slight cough. The Medical Officer informed me that there had been some slight mottling of the skin originally, but no rash.

The following were the relevant pathological findings :

27th May 1940. Widal negative.

Weil-Felix test.

(1) **5th June 1940.**

B proteus X19 . . . . . full positive in 1/200
" " X2 . . . . . full positive in 1/200
" " XK . . . . . full positive in 1/12

(2) **6th June 1940.**

Overnight the X19 and X2 strains were agglutinated to the same titre - full positive in 1/500, partial in 1/1,000. The Kingsbury strain showed no agglutination above the 1/12 dilution.

In the light of these findings, it was obvious that the patient's illness had been typhus fever, and steps were immediately taken to round up all contacts.

On further inquiry it was learned that there were six remaining members of the family living in two tents outside Mountcharles at the time. These were all brought into the Fever Hospital that evening, and the Sanitary Sub-Officer was instructed to destroy the bedding and clothing of both the patient and the other members of the family, and to disinfect the tents. On personal inspection I found these latter to be merely large squares of sail-cloth rigged up on low wooden supports to keep off the rain. The family crept in under these on all fours when retiring to bed.

At this stage it was deemed advisable to acquaint all the medical officers in the county of the occurrence of cases of typhus fever in two places as far apart as Glenties and Letterkenny (approximately 25 miles) and to let them know of the movements of the family of tinkers then in Mountcharles. Accordingly the following circulars were issued to all doctors in the county :

Department of Public Health,
Stranorlar,
Co. Donegal,
11th June, 1940.

CONFIDENTIAL.

Typhus Fever in County Donegal.

A Chara,

I wish to bring to your notice the following facts :—

1. A young man named M. K. died of Typhus Fever in Letterkenny Hospital on 28th May, 1940. Weil-Felix test positive in 1/5,000. No louse or flea infestation present. His illness started on 16th May, 1940.

2. A family of tinkers named S, who have a house in Boyle, County Roscommon, are now in Donegal Fever Hospital. 5 out of this family of 8 persons have been ill within the past six weeks, and it has been discovered that the illness is Typhus Fever.

These people left Boyle in March, 1940, with two tents and some livestock, and have been on the road since. They were in Moville for one week early in May, 1940, thence to Carndonagh 12 days, Carrowkeel 5 days, Letterkenny 1 night, Glenties 1 week, Mountcharles 2 weeks. If the parents' statements are reliable, no rash appeared during their illness. The first case diagnosed in Donegal Hospital (M. S., 19 years) had no rash, though there was some mottling of the skin. The first to fall ill was E. S., 3 years, at Buncrana He was ill for 13 days and thought to have had Bronchitis. The following cases then occurred :—P. S., one year and eight months (ill one week) ; M. S. 18 years (ill 2 weeks) ;—both at Carrowkeel (Innishowen) ; M. S., 10 years ; A. S., 7 years—both ill for 2 weeks at Mountcharles.

A general account of the disease was included in my Annual Report, 1938, but it may be of use to recapitulate the following (page 15 of the Report) :—

"The following symptoms are observed in early stages of the disease : shivering, headache, fever and general malaise. Often there are in addition pulmonary manifestations in the form of **bronchitis** and sometimes of **pneumonia, and these are liable to give rise to errors in diagnosis . . . .**

The duration of the malady is, in most cases, about two weeks, and the temperature remains at a considerably high level. A fever lasting two weeks accompanied by persistent headache has been found the most characteristic clinical picture at the onset of an epidemic. Sometimes, however, in young people, the fever does not last for two weeks, it is often of shorter duration.

. . . . An important point is that the pulse is usually from 110

to 150 per minute. The respirations may be rapid, and there is a well marked leucocytosis towards the end of the illness."

I would like to remind practitioners that cases of Typhus give a positive Weil-Felix test on a sample of blood. This department should be immediately informed of any suspicious cases, and the blood submitted to a Weil-Felix test.

Mise, le meas,
M. S. BASTABAL,
County Medical Officer of Health.

To/Each Medical Practitioner in **County Donegal.**

PUBLIC HEALTH DEPARTMENT,
Stranorlar,
Co. Donegal.
15th June, 1940.

TYPHUS FEVER.

A Chara,

The following additional points should be noted :—

1. **Diagnosis.** All cases of fever with sudden onset occurring in times of epidemic prevalence should be regarded with suspicion, and treated as possible cases of typhus fever until the latter can be excluded. Before the appearance of the rash (which occurs only in some 70 per cent. of cases) there is no criterion by which a definite diagnosis may be made. The presence of lice (or fleas) and the history of contact with cases of similar illness are of importance.

2. **Weil-Felix Test.** This test is of great value but may not be positive until about the tenth day. It should be carried out early, however, as a rise in the titre of the reaction is a valuable diagnostic sign. Reactions of less than 1/200 should not be regarded as diagnostic unless the titre has risen greatly from the onset. By the twelfth to the sixteenth day the reaction often becomes positive in dilutions of 1 in 1,000 to 1 in 5,000. During convalescence the response gradually becomes more feeble, so that the reaction is often negative in the third or fourth week of convalescence.

Mise, le meas,
M. S. BASTABAL,
County Medical Officer of Health.

To/Each Medical Practitioner in **County Donegal.**

These circulars summarised the rather meagre information then available to this department, but were of great practical utility, as they almost immediately led to the discovery of five further cases in and around the Mountcharles area—all, except one, of the vagrant class. The one exception lived in a lodging-house fre-

quented by vagrants, so that all the cases apparently arose from the one source.

The occurrence of the single case in Letterkenny was puzzling, and direct evidence of contact with suspicious cases was not established. It was ascertained, however, that the S. family had stayed in Letterkenny for one night on their way to Glenties, and M. S. was at the pictures twice during their stay there. He was presumably in the incubation stage of his illness at the time, and may have been a casual contact of the fatal case of M. K. If this was the origin of the latter's illness, he was doubly unfortunate inasmuch as no other case has been notified from Letterkenny, and he was the only one to die.

There were in all some forty odd contacts dealt with as a result of the first eleven cases. These contacts were all brought into hospital, deloused and bathed and detained for varying periods until they were considered to be non-infectious. Their personal clothing, together with all bedding and bedclothes were destroyed by burning. Furthermore, the sites of their encampments were visited, petrol poured over the sites, and set alight, in order to destroy any verminous remains.

As already mentioned, the contacts of the twelfth proved case (which occurred during my absence on anuual leave) were not treated, and had left the county on my return. The origin of this twelfth case was not ascertained, which was unfortunate, as it would have been interesting to find if the infection still lingered in any of the previous contacts. This was unlikely, however. The patient denied all contact with any of the previous cases or their families, though such statements from people of this class cannot be relied on. One might surmise that an unnotified intervening case (or cases) of typhus had occurred in the interval in some contacts, thus giving rise to the twelfth case in our series. This is, of course, merely surmise, but it is difficult to account otherwise for the occurrence of a fresh case after a lapse of thirty-one days, unless it was a case of delayed infection, which is very improbable.

The following illuminating extract from the Board of Health Minutes for August, 1940, illustrates some of the difficulties encountered in this investigation :

3394/8/'40.

"Read letter from Matron stating that on the 5th August, the Assistant County Medical Officer of Health informed her by 'phone that she was sending in twelve contact Typhus cases. She informed the Assistant County Medical Officer of Health that Fever Hospital was temporarily closed and that the staff were on holidays, but the Assistant County Medical Officer of Health requested her to have it re-opened and the services of a temporary nurse obtained.

She did so and the Nurse waited up till 4.30 a.m. but no patients arrived.

On the following day Dr. G. requisitioned their Ambulance to take in the same patients. He sent a man with the driver, but although they searched the country-side until late in the evening they failed to find any of the patients.

At 9 a.m. on 16th August the Assistant County Medical Officer of Health again asked for their Ambulance to take in eleven contact Typhus cases (same party). The ambulance left shortly after 9 p.m. and did not return until 5.30 next morning, having had a breakdown. The driver succeeded in collecting eleven cases at different stations, and, with the assistance of the Guards, they were put in the Ambulance. They refused to enter the Hospital when they arrived. Dr. H. was called in but he could not persuade them to enter. Guards were then sent for but by this time the contacts had disappeared having previously threatened to burn the hospital and kill the nurse."

The outstanding facts, however, were :—

(1) No cases of typhus had been seen in County Donegal since 1931.

(2) The S. family came from Boyle, County Roscommon, a a short time before they developed typhus.

(3) The only two cases in this epidemic which were not definite contacts of the S. family (i.e., could not be proved to be such) occurred in places where the S. family had encamped. (It was ascertained they had spent some nights encamped in Ballybofey, where this last case occurred).

(4) All the cases, except one, were in people of the vagrant class, who notoriously foregather and intermingle in their wanderings.

(5) W. S., the mother of the S. family, had an indefinite illness of short duration in April, 1940, but she says she had typhus fever in Galway 25 years ago.

(6) The first (presumably) case in the S. family occurred in Buncrana, where E. S. fell ill one day after arrival. As they had been in Carndonagh for twelve days previously, it is reasonable to suppose that E. S. was infected there. On inquiry it was learned that the S. family had camped at a place known as "The Dump," where another vagrant family had been for some time, having been moved on the previous day by the Guards.

At least one case of illness (a child who died) was said to have occurred in this last family some weeks previously. The history was, however, very vague.

There are thus two probabilities to account for this epidemic :

(a) The S. family brought the disease with them from County Roscommon.

(b) They were infected by other tinkers in Carndonagh.

In either case tinkers were the origin of the malady, and it is a reasonable assumption that they keep up the infection amongst their fellows by their wandering life and their well-known commingling. Unfortunately in this epidemic the only case in the non-vagrant class succumbed to the malady.

It would seem that the only rational thing to do if a case of typhus occurs in future is to segregate and delouse all tinkers in the county, pending some more comprehensive general legislation.

Practical deductions from the epidemic of typhus.

(1) **Importance of diagnosing first case.**

It should be emphasized that a noticeable rash may not appear at all in many cases, though there is a general impression that typhus is diagnosed on the appearance of the characteristic rash, and, indeed, many of the text-books lead one to infer that the rash always occurs. In this present series of twelve cases, only four had a perceptible rash.

(2) ALL nomads suffering from any illness with a raised temperature should be suspected until proved innocent of the malady. In the case of these people or their contacts the disease should always be in the forefront of the doctor's mind. They are a distant menace owing to their wandering habits and they may infect several counties before the first cases of the illness are properly diagnosed. No suspicion of the disease would probably have been aroused at first in this series were it not for the fortunate accident of the Letterkenny patient developing a typical rash two days before he died.

(3) Probably these nomads form an important, if not, indeed, the sole reservoir of infection in this country now. It raises the important question for our Government whether these people should not be impounded by law, in the event of hostilities breaking out in this country, and thoroughly disinfected, with destrucion of all their belongings. It might save us the thousands of pounds—and of human lives—that this disease must have cost us in the past. Indeed, it is a question if this shouldn't be done now ! In any event some legislation should be evolved to deal with these people even in normal times, in order to try and prevent their dissemination of infection

through their desultory wanderings all over the country.

(4) Vagrants of this nature are very difficult to deal with at present. In the last case of our series (which occurred during my absence), the contacts refused to go to hospital, and immediately left the county—as far as could be ascertained. How many of these subsequently developed typhus or communicated it to others has apparently never been ascertained!

The new Emergency Powers Order (1940) goes some way towards solving the problem of compulsory hospitalisation of contacts, though it means establishing hasty contact with Dublin and awaiting the Minister's Order in circumstances that may require very rapid action.

The text of the Order in question is given at the end of this section.

Diagnosis.

(1) ALL vagrants, suffering from a febrile illness should be carefully deloused, their clothing disinfected, and they should be segregated from other patients until the nature of their malady is ascertained.

(2) Their blood should be tested for the Weil-Felix reaction **as a routine**, apart from any other tests thought proper to their illness. It must be borne in mind that this reaction does not manifest itself until the 5th to the 10th day. Hence a negative reaction within the first ten days should not definitely rule out typhus. Furthermore, a tiny fraction of patients give a negative result. One must then rely on less objective data. It must not be forgotten that a positive Widal, even up to 1/400 dilution, has been occasionally found in undoubted cases of typhus fever. This is especially liable to happen in those who have been immunised against the enteric group of fevers. In the case of contacts and others, who may have been ill, it is well to remember that the Weil-Felix reaction gradualllly becomes feeble in convalescence, and may be negative in the third or fourth week.

Of course one of the great difficulties about vagrants is that they seldom go into hospital with any illness, and in the ordinary course of events one has no means of ascertaining when sickness does arise in their midst. They always endeavour to conceal it, so as not to antagonise the local people, who would report the illness and ostracise them in case it might be infectious.

(3) **Blood-count.**

A leucocytosis is very common, as indicated elsewhere.

(4) **Cerebrospinal Fluid.**

A constant "cellular reaction" forms an important aid to diagnosis, acording to Danielopolu.

(5) Most important clinically is a **short sharp illness** lasting about two weks, characterised by delirium and prostration. The typhoid group of fevers usually last longer and do not manifest a sharp, sudden onset. The pulse is also rapid in typhus.

(6) In the absence of a rash the disease is most apt to be diagnosed as bronchitis or broncho-pneumonia—just as not infrequently occurs in the early weeks of some typhoid fever cases.

(7) In last year's summary I stated that 'sore throat' was not a symptom of typhus. I should perhaps modify that statement, and say that sore throat is not an outstanding symptom of typhus. Strong (Serbian Epidemic) says :—"It is recognised that in the early stages of typhus there are likely to be inflammatory conditions of the mouth, nose and throat." The fatal case in our Donegal series told me the day before he died that he had felt his throat slightly sore the previous day.

Finally, when typhus fever occurs without a rash, the disease is extremely likely to go undiagnosed, unless the condition is borne in mind, or until typical cases begin to crop up as a sequel. The routine performance of Ehrlich's Diazo Reaction in fever hospitals would be of some assistance in doubtful cases, as the reaction is said to be markedly and invariably positive **from the onset** in Typhus fever. Its value is somewhat impaired by the fact that it is not peculiar to typhus fever, being positive within the fourth and tenth days in the enteric group (usually in the second week), and it may be found in measles, scarlet fever, pneumonia and tuberculosis. Measles and enteric, the only diseases in which it is present in any great frequency, may usually be diagnosed by other means, though in any typical case of typhus the differentiation from enteric may be very difficult.

It is further worth noting that the disease may be very mild in children, sometimes lasting only a week or even less.

TYPHUS FEVER.

Historical.

Hirsch states that the history of typhus is written in those dark

pages of the world's history which tell of the grievous visitations of mankind by war, famine and misery of every kind. In every age, as far back as the historical inquirer can follow the disease at all, typhus is met with in association with the saddest misfortunes of the populace. From Corradi we learn that typhus fever was epidemic in Italy in 1505, and shortly afterwards spread from there all over Europe. In a third epidemic in Italy in the second half of the sixteenth century it is said to have destroyed more than one million people in Tuscany.

In the seventeenth century typhus was again one of the diseases which caused the highest mortality. So great were the miseries engendered by it and by the other events in connection with the Thirty Years War, that Haesar, writing of this period with reference to districts formerly well populated, says that one could wander for miles without seeing a living soul, only dead bodies decomposing and partially devoured by wolves, dogs and vultures for want of a decent burial. Towards the end of this century Morton implies that practically every hospital in England was filled with typhus victims. The eighteenth century saw no abatement of typhus epidemics, and there is scarcely a year during the century that one may not find reference to epidemics of the dread disease.

Ireland had long been infected by typhus, and particularly from 1708, this country was ravaged by one epidemic after another. At the beginning of the eighteenth century the population of Ireland was estimated at about seven millions, and during 1846-47 the number of sick at one million, about one-seventh of the population. In Dublin alone there were 60,000 cases of the disease. Since 1815, apart from smaller epidemics, the disease has spread widely six times, the epidemic of 1846-'47 above referred to being one of the severest, and the last of these six severe epidemics being from 1862-'64.

To come down to more recent times, since 1907 the death-rate from typhus in **England** has been less than one per million living. The maximum incidence occurs during the winter—i.e., during the colder weather, when crowding together of those below the poverty-line is most likely to occur.

In 1918 an outbreak of typhus occurred amongst gypsies in Surrey and Sussex. Of 25 cases, five proved fatal. This outbreak was practically limited to a few families of gypsies.

Coming nearer home, the following table **for Ireland** indicates the incidence of the disease in each year since 1927, as well as the deaths registered, and the death-rate per 100,000 of the population :—

Year	Urban	Rural.	Total.	Number of Deaths.	Death Rate per 100,000 of Population.
1927-8	9	4	13	9	0.3
1928-9	5	24	29	10	0.3
1929	—	12	12	7	0.2
1930	3	45	48	4	0.1
1931	—	17	17	11	0.4
1932	3	27	30	8	0.3
1933	—	12	12	3	0.1
1934	—	17	17	4	0.1
1935	—	3	3	2	0.1
1936	1	11	12	2	0.1

Osler has remarked that the gradual disappearance of the disease in Great Britain and on the continent has been one of the great triumphs of sanitation and this also proved to be the case in connection with the epidemic in Serbia. It will be recalled that this epidemic of typhus fever was the first extensive and serious one to occur since the demonstration of the method of the transmission of this disease by lice in 1909-10. It should be emphasised that the efforts of all the physicians, sanitarians, nurses and particularly of the people generally in Serbia being directed against the spread of the disease by lice, the suppression of the epidemic by intensive work was accomplished within a period of six months.

TYPHUS FEVER.

Doctor Danielopolu of Roumania, who has been through several epidemics in his native country has some interesting things to say about typhus under war conditions. Accordingly the following resume of some of the important points in his address should be of concern to any country where typhus is still endemic.

TYPHUS FEVER IN WAR.

(Bulletin Mensuel—Off. Int. d'H. Pub. Tome XXXII. Mars 1940, No. 3).

The forms of endemic typhus are generally much milder than those met with during epidemics. It is, of course, an axiom that there cannot be an outbreak unless some reservoir of the virus exists in a country. In Europe, Russia represents the great reservoir of typhus infection. During the Crimean war the Russians were the first to succumb and only later the French and English. Started in December, 1854, the epidemic reached its height in May-June, 1855, became atteunated during the summer of 1855, and again attained major proportions in December, 1856. It finished only with the end of the war. But the evacuation of the troops had disseminated typhus into different towns :—Constantinople, Gallipoli, Marseilles, Toulon, Lyons. A further intense epidemic of typhus occurred during the Russo-Roumanian-Turkish war of 1877-1878. During this war also, the malady commenced among the Russian troops before they had crossed the Danube. The epidemic was very severe and caused many victims, the hospitals of Roumania and Bulgaria being full of cases. The malady was at that time in Roumania termed ' Black Typhus.'

Except for some slight epidemics with ten or so cases among nomad gipsies, Roumania was exempt from typhus until the end of 1916. The virus was brought into the country by Russian troops..

It is only in widespread epidemics, especially in war that one sees the complete clinical picture of typhus. The hypertoxic forms which appear only under war conditions as a rule give an integral picture of the malady and serve to show what a fatal disease it may be. These forms are infinitely rarer in the endemic centres of the disease, and not often observed in epidemics occurring in peace time. . . . . **It may be asserted, therefore, that to know typhus well, one must study it in war time epidemic prevalence.**

For countries bordering Russia, the question of typhus fever becomes one of the most important problems of war medicine.

Dr. Danielopulu considers that in the event of a severe epidemic the question of anti-typhus vaccination with the murine virus would immediately require consideration. He is of opinion that it is of great utility, along with delousing, in the prophylaxis of this infection.

Typhus fever (as also relapsing fever) is spread by the body louse. It is, therefore, safe to assert that a patient with active typhus who is kept free of lice is no longer contagious.

Certain authorities maintain that typhus may be transmitted by the head louse as well as by the body louse. Dr. Danielopolu does not believe this. He is strongly of opinion that the sole vector of the disease is the body louse.

In the transmission of typhus, the louse is generally infected between the seventh and tenth day following his sucking the blood of a typhus patient. En passant, it may be stated that in order to become infected, the insect must suck the blood of a typhus patient during the febrile period or in the last two days of the incubation period, or during the first two days of the apyrexial period; in these latter two days infection is uncertain. It is admitted that transmission of typhus takes place by contact between a breach in the skin surface of his victim and the faeces of the louse, which are excessively virulent. Dr. Danielopolu admits that this mode of transmission is possible, and has been proved experimentally. **He is of opinion, however, that this is not the natural and habitual method of transmission.** He is strongly of opinion that the usual method of infection is by the bite of the louse; that it is this bite which causes the opening in the skin which is necessary for the introduction of the virus into the blood. He maintains that this method of infection is in strong contrast with that in relapsing fever, where the skin lesion arises as a result of scratching, and through this skin lesion the blood of the infected louse gains entry to the human body, as a result of the crushing of the louse at the period of scratching. Relapsing fever also arises as a result of infecting the conjunction of the eye with fingers contaminated with **the blood** of crushed (infected) lice.

Dr. Danielopolu says that if typhus arose from the placing of louse faeces on a skin lesion already existing (as from scratching) the malady should be very rare in epidemic prevalence among doctors and others who observe certain rules of hygiene, who do not carry many lice, and present very few scratch marks. In these cases, breaks in the skin surface do not exist or are very rare, and only an exceptional case should contract typhus.

Actually the disease was very widespread among doctors during the Moldavian epidemic of 1917—1918. There were several instances of doctors who made a careful personal examination every day, who were not habitual carriers of lice, who felt the bite of only a single louse, and who at the end of eight days had contracted typhus fever. He gives other examples from which he concludes that it is difficult to believe that the transmission of the disease in such cases could have arisen from the deposition of louse faeces on a pre-existing lesion of the skin. "The role of the louse bite is certain."

Accordingly he believes that the natural transmission of typhus fever takes place as follows. In mid-winter, especially in troops, among the carriers of many lice, who as a result of constant scratch-

ing have many slight breaches in the skin surface, the simple placing of its excrement on a scratched area by an infected louse will suffice to cause typhus fever. But even in these conditions, and especially amongst those who are carriers of many lice, transmission is usually by the bite of the louse, which either inoculates the virus in a form unknown at present, or else produces a surface breach where the louse has already deposited its faeces on the skin. It is known also that the infected louse itself is very ill and suffers from diarrhoea, so that it is not inconceivable that the insect may contaminate its own biting parts by means of its own excreta. One must likewise admit the possibility of transmission of typhus through the conjunctival mucous membrane of the eye by contact with this surface of fingers contaminated with louse faeces. But that usually means that the individual concerned is heavily infested with lice, having contaminated his fingers by scratching the bare skin and possibly from crushing the lice in situ.

The incubation period is about eight days. In several cases of doctors and nurses not infested with lice, who were able to establish exactly the date of being bitten by a louse, it was found that the malady commenced seven or eight days later.

The different forms of typhus observed :

(1) The form of fifteen days duration, which according to the degree of toxicity may be slight, moderate or hypertoxic.

(2) The abortive form (lasting less than fifteen days).

(3) The unapparent form.

These latter (unapparent) forms constitute a reservoir of the virus, and play an important role in the spread of the disease.

Signs. (1) Injection of the conjunctiva and flushing of the face. (2) The rash. (3) Low blood pressure, appearance of the extremities and collapse. The upper and lower extremities show three different phases :

(a) red and flushed (warm)

(b) purplish and warm.

(c) purplish and cold.

(The essential lesion in typhus is an affection of the blood-vessels).

(4) The kidney presents phenomena due to the vesçular lesion. Of these haematuria is a constant finding but is usually microscopical in character.

(5) Healed tuberculous patients may cough up blood. In hypertoxic forms may be noted : stupour (more intense than in any other infectious malady), " typhoid state" (pronounced), delirium (often violent, even leading to suicide), jerking of the tendons, carphology, difficulty in swallowing and in breathing, convulsions, hemiplegia, pupillary changes (meiosis, unequal pupils, Argyll-Robertson pupil).

The pupillary phenomena are identical with those produced by syphilis. So that in countries where typhus is rife, the Argyll-Robertson phenomena and other pupillary changes are in no way pathognomonic of nervous syphilis, and if confronted by such a case one must always try and ascertain if the patient has previously suffered from typhus fever.

The alterations in the C. S. F. are of great interest. **They are specific for typhus,** and are as follows :—

(a) Appearance clear and colourless in mild forms, slightly turbid in hypertoxic forms.

(b) The liquid is yellow (xanthochromia) in many hypertoxic forms. A yellow liquid is of bad prognostic import.

(c) In very rare cases the liquid coagulates—a very bad sign.

(d) Albumen increased in amount.

(e) The most frequent modification in the cellular reaction. No case of typhus lasting fifteen days lacks this finding ; **so that this phenomen constitutes a diagnostic measure of the first order.**

In mild and medium cases one finds 5 to 30 cells per c. mm. ; in hypertoxic forms, 30, 100 and even 300 cells.

Mild form : Increase of lymphocytes, few mononuclears, very occasional plasma cells. Liquid colourless, does not coagulate.

Form of medium severity : Slightly greater increase of lymphocytes, some occasional polynuclears, monocytes and red blood corpuscles (inconstant). Slight xanthochromia. Slight coagulation (inconstant).

Severe form : Pronounced increase of mononuclears, large number of plasmocytes, fairly large numbers of polymorphs and monocytes, numerous red blood corpuscles. More intense xanthochromia, and marked coagulability.

Abortive Form : The reaction is feeble and almost nil.

The Blood : Dr. Danielopolu demonstrated in 1917 that the blood

of typhus patients shows special characteristics of the white cell count which permit of establishing both diagnosis and prognosis.

Mild forms : Leucocytosis not marked (10,000—16,000). It follows the temperature curve closely, and a lencopenia develops with defervescence.

Medium forms : If the clinical phenomena persist after defervescence the leucocytosis which may be in the region of 20,000, corresponds to these phenomena and falls only after several days of apyrexia.

Hypertoxic form : The number of leucocytes often exceeds 20,000. It may rise to 30,000, 50,000, 80,000. The maximum count was 126,000. **Of all general infections typhus is certainly the one that gives rise to the most intense leucocytosis.** Most interesting is the fact that the toxic factor influences the leucocytosis in a very special manner. Thus, while in other infections, as soon as the temperature falls, the leucocytosis diminishes, in **the hypertoxic forms of typhus it goes on increasing after defervescence in spite of the apyrexia, and even until death ensues.** Mononucleosis is the common finding ; lymphocytes, monocytes, plasma cells. Dr. Danielopolu concludes that a very marked leucocytosis with many plasmocytes and monocytes confirms the diagnosis of typhus.

Prognosis from leucocyte count :

(a) Any form of typhus accompanied by a leucocytosis not in excess of 20,000, which follows the course of the temperature curve, or which is not prolonged more than a few days after defervescence terminates in the majority of cases in cure.

(b) Any form of typhus where the leucocyte curve exceeds 20.000, and continues to rise during the second week, and even after defervescence, usually terminates in death.

(c) The very aged or very delicate may prove exceptions to this rule because their blood-forming organs may not react sufficiently, and they may be gravely ill with typhus, though showing only a slight leucocytosis.

The meiosis, inequality of pupils, Argyll-Robertson sign, are symptoms of typhus, rather than complications.

After typhus fever, tuberculosis progresses with striking rapidity. Old foci of the disease are brought to life, and death may supervene in a few weeks or months from cachexia. No other infectious malady predisposes in such a marked degree to the rapid evolution of pulmonary tuberculosis.

Dr. Danielopolu treats his patient with chlorine water containing 0.50 gr. Cl and 6.50 gr. Nacl per 1,000 c.c. of water. He gives an intravenous injection by the drop method, once a day, of 500 c.c. of this solution, and claims very good results from the method.

Diagnosis. The Weil-Felix reaction on the blood is of great value taken in conjunction with the physical signs and symptoms. In mixed typhoid infections, a leucocytosis exceeding 20,000 would suggest superadded typhus fever. An added indication would be the presence of numerous plasma cells and monocytes in the blood. If these signs are not found, and mild superadded typhus is suspected, examination of the C.S.F. will give a sure diagnosis. This is always more or less altered in typhus, and presents at least **a cellular reaction, a phenomenon which is never found in typhoid fever.** The absence of any reaction in the C.S.F. is a certain sign that typhus fever is not in question.

The personnel attending on typhus patients who may have been imperfectly deloused should wear a special costume, leaving no opening except for the front of the face.

The results of anti-typhus vaccination with the murine virus in Tunisia showed that Europeans are much more sensitive to the virus than the natives. So that certain experimental work would require to be done before introducing this method into Europe. (Actually since this is a living virus, there is a risk of introducing a new epidemic disease by this vaccination). The new disease is, however, very mild, and in face of the danger of epidemic typhus the vaccination technique would require serious consideration.

SERBIAN EPIDEMIC 1915 (REPORT OF AMERICAN RED CROSS MISSION).

The epidemic of typhus which occurred in Serbia in 1915 was one of the most severe which the world has known in modern times. It not only interrupted and suspended for approximately six months all important military activities of the Serbian Army, but it also delayed the military advance of the central powers against that country during this period. The epidemic was, moreover, particularly characterised not only by its magnitude, but by its high virulence and high mortality. During the height of the epidemic the number of new fever cases entering the military hospitals alone reached as high as 2,500 per day, and the number of reported cases among the civilian population was approximately three times this number. How many more unreported cases actually occurred one will never know. The mortality during the epidemic varied at different periods in different localities between 30 and 60 per cent., and in complicated cases sometimes reached 70 per cent. Over 150,000 deaths occurred within six months before the epidemic could be suppressed. Coincident with the epidemic of typhus there occurred an

epidemic of relapsing fever, and there was present much typhoid fever.

Serbia, war-worn and weakened, with her resources already overburdened, was in no position to combat such an epidemic as that with which she was confronted in 1915, and when this outbreak of disease was well started it spread almost unrestrictedly throughout the land. There were approximately only 350 Serbian doctors in the country prior to the outbreak, and these bravely took up the fight against typhus in 1915, but their number grew less day by day . . . . Indeed, the majority of the small number of Serbian doctors sooner or later became afflicted with the disease, 126 of them succumbing to it, a mortality of 36 per cent. . . . Of the thirteen physicians in the hospital at Pirot, twelve contracted the disease and six died of it.

. . . . It was exceptional in most of the hospitals to find only one patient in a bed. Usually there were two or three patients in the same bed and the available floor space was also covered with patients without beds ; sometimes lying upon straw, on blankets, or closely huddled side by side on the wooden flooring, often even under the beds. There were no lavatory or toilet or bathing facilities for the patients, no clean linen or clothing for them, and no systematic disinfection of such linen or such beds. There were usually no nurses, and often only a few Austrian prisoners as attendants . . . .

. . . . "In certain hospitals, where patients had removed their clothing upon entrance, I have seen many piles of such clothing lying in the entrance room with thousands of living lice and ova upon the garments not yet disinfested. Indeed, many hospitals were without apparatus for sterilising or disinfesting, or possessed only unsatisfactory appliances for this, and patients came and left if they recovered without their clothes being washed or disinfested. In a few hospitals the conditions were so bad that the dead lay unburied for days at a time. The conditions in the prison camps were often worse; the buildings used as prisons were almost invariably greatly overcrowded and insufficiently ventilated. Inmates of these prison camps I always found very lousy on first inspection. These camps were very dangerous to inspect, and during the war many cases of typhus were undoubtedly contracted in connection with work in the various prison camps. In Serbia they proved to be veritable death traps. It was necessary to institute rigid sanitary reforms in almost every one of these prisons before the disease could be eradicted. Over one-half of the 70,000 Austrian prisoners in Serbia died of typhus during the emidemic.

Sir Thomas Lipton, who did so much for the Serbian people during this outbreak, gives the following account of his experience:

"I met on the country roads many victims too weak to crawl to a hospital. Bullock-carts were gathering them up. Often a

woman and her children were leading the bullocks, while in the cart the husband and father was raving with fever. Scarcely enough people remain unstricken to dig graves for the dead, whose bodies lie exposed in the cemeteries. The situation is entirely beyond the control of the present force, which imperatively needs all the help it can get—tents, hospitals, doctors, nurses, modern appliances and clothing to replace the garments full of typhus-bearing vermin."

Captain Bennett, of the British Red Cross, described another prison camp as follows :—

"It is not a hospital, remember, but simply an area where 750 Austrians have been collected ; nevertheless the disease has fallen like a blight upon the camp. At an earlier date one doctor was in charge of this camp, but he is now stricken down by typhus, and various forms of infection of the malady are raging unchecked. Typhus, dysentery, smallpox and diphtheria have swept over the place with devastating effects. Last week only twenty men out of 750 could stand on their feet. There they lie in utter wretchedness. Here and there one finds a mattress and here and there a little straw, but the bulk of the sick men were stretched out on the muddy ground. Their clothes are foul and alive with vermin which spread the deadly typhus. The silence of the camp is broken only by sighs and groans. A recent visitor noticed a number of recumbent forms covered with greatcoats and found on removing these that five out of the number had already been dead several days. There was nobody to remove the corpses. Here and there some poor wretch crawled about on his hands and knees to fetch a cup of water for his prostrate comrade. This was all the attendance which was visible, and the shocking conditions of the men and the ground on which they lie can be imagined. Can any one be surprised to learn that some sixty men die in this camp every day ? Every man in this hideous environment and all his comrades who will subsequently enter it are practically appointed to die unless help comes speedily. Uskub is a veritable valley of the shadow of death. If the tired nurses leave the crowded hospitals for a little exercise and fresh air they are met by a long procession of bullock wagons carrying rude coffins to the cemetery. Sometimes three coffins with unfastened lids rest on the same cart and the bodies of the dead are exposed as the wheels jolt over the rough pavements."

With reference to one of the hospitals he writes :—

"It is practically impossible to go near it ; so overpowering is the stench in the street outside that nobody who is not compelled to approach the building can bear to be in the vicinity. Details of the interior cannot well be printed."

Dr. Butler, describing his hospital, says :—

"Into this factory, capable of holding no more than 750 patients

on a rational apportionment of floor space, had been huddled 1,300 wretched beings, in filth indescribable. The majority of these were suffering from badly infected compound fractures, the result of shrapnel. By actual count there were 192 beds, many of which required propping up to keep them on their legs. Of mattresses, blankets, sheets there were too few. A little corner of the basement, about 25 feet square, filled chiefly by stairways was serving as laundry, presided over by six very dirty peasant women. Needless to say, it was inadequate to meet the demands made upon it. In another part of the basement was a huge pile of exceedingly filthy clothes from the wards. Above, and next this were stacked the supplies of food to be served later to patients and staff, after passage through the squalid little shed that was called a kitchen. Water came from shallow surface wells. It was turbid, and tasted and smelled badly. Subsequent examination showed evidence of sewage pollution in several of these wells. Excreta, sputum, and pus-soaked dressings were scattered everywhere within and without the building. Vermin, especially the body louse, were omnipresent. The stench of the whole thing was overwhelming. Typhus was present in sporadic cases even when we arrived and caused some anxiety, but it was fully a month before the great epidemic that overwhelmed Serbia broke and our units were hard hit. Of the six surgeons, four had become infected, and of these one, Dr. James F. Donnelly, had died. Dr. Magruder and myself had escaped typhus."

Later Dr. Magruder, worn out by overwork, finally contracted the disease and died. He felt that he was unable to relinquish his duties, and did not go to bed until he had been ill for five days. As Dr. Butler had said of him, "He passed out honourably fulfilling the trust imposed on him by the American Red Cross, honourably upholding in the foreign war zone the ideal of one of the noblest institutions of his native land. A christian of the true type that feared not to face death that others might profit by his labours."

Dr. Jeanneret-Minkine, of the French Mission, noted in a military hospital, with regard to infested clothing, which had been disinfected by steam :—

"The vermin, however, persisting, I concealed tiny bags of paper filled with lice and nits in the uniforms. When they had been steamed at 80° C for half an hour, I found that the big ones were all dead, but several of the smaller ones revived after being on the skin of a convalescent patient for an hour, on which I had placed them wrapped in a piece of linen covered with sparadrap. In some of the nits, the movements of the air bubbles inside showed that the embryo was still alive. It was, therefore, necessary to heat the sterilizer to 100°C, and to leave the uniforms in it, less tightly packed, after this temperature had been obtained. Moreover, in the larger wards, the recruits who had just been deloused were reinfected by the men who had not yet been disinfected."

The epidemic increased through January, rose more rapidly in February and March, and reached its height in April when the number of cases in the army and civilian population was in the neighbourhood of 9,000 per day.

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The general plan of the campaign against typhus included: general disinfestation of people in badly infected districts; general house-to-house inspection in such districts with removal of patients to hospitals for typhus cases; disinfestation of other inmates of such houses; disinfection or disinfestation of houses from which patients were taken or in which deaths from typhus had occurred; the establishment of quarantine and bathing and disinfesting stations at important points throughout the country; the limitation of railway travel by reducing the number of passenger trains; and the establishment of a system of limited travel permits and of inspection of travellers, only cars with wooden seats with no upholstery being permitted to be run; provision for the cleaning and disinfecting of such cars after each journey; provision for the cleaning and disinfestation of public vehicles, particularly of cabs at the railway stations, the sanitary inspection of restaurants and cafes, and the establishment of regular hours of closing during the day for cleaning and disinfection, and the methods to be employed for such disinfection; regulations for hospitals in connection with the disinfestation of the wards, beddings and linen, and of the inmates and their clothing; the establishment of free dispensaries in various cities, not only for the treatment of the sick, but for the early detection of individuals suffering with infectious disease; a campaign of education with printing and distribution of circulars in the Serbian language regarding the nature of the disease, the manner of its spread, and the precautions to be taken to avoid infection.

. . . . . .

While the use of the highly perfected portable steam sterilizers such as the 5-ton Thresh, is obviously very desirable in an epidemic, experience in the Serbian outbreak demonstrated that they were not absolutely essential for overcoming the outbreak. One may, indeed, when it is necessary, successfully combat typhus with such essentials as improvised baths, clean clothing, fire for producing heat, roughly constructed disinfestors of boards, bricks and earth combined with sulphur and petroleum.

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An attempt was made to arrange for a disinfesting plant of some nature in every town.

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Heat whenever it could be employed was considered by far the most satisfactory means for the destruction of lice and nits.

When dry heat was used, and thermometers were available to register it, a temperature of about 60°C for fifteen minutes was regarded as a fairly safe standard for routine practice in connection with the delousing of clothing and blankets. When steam was available for disinfestation, it was the custom to submit articles to a

temperature of 100°C for half an hour in order to allow the steam to penetrate thoroughly all parts of the clothing. Fur coats and shoes are obviously likely to be ruined by steam disinfection. However, hot air at 60° C for half an hour does not injure either fur or shoes if they are dry before being heated to such a temperature. Shoes may also be disinfested with petroleum.

. . . . . .

Spraying with petroleum from a fine spray was rather generally employed after bathing. No injurious effects were observed, and it did not seem to cause much dermatitis in the Serbian people. Petroleum often appears to kill lice within a minute, and does kill them almost invariably within two or three minutes. Some laboratory experiments seem to show that nits are sometimes not killed by petroleum in twenty minutes.

. . . . . .

Sulphur fumigation in the disinfestation of potentially infective houses and wards during an epidemic, on the whole, is probably the safest and most satisfactory disinfectant for general employment at our disposal. **If employed thoroughly and in a proper manner** the adult lice are destroyed. The procedure may be repeated after an interval of eight days, in order to kill off any lice that may have hatched out in the interval from nits not destroyed by the first fumigation.

In Serbia, for general disinfestation by sulphur fumigation not less than five to eight pounds of sulphur were employed per 1,000 cubic feet, the room or ward being carefully sealed up for a period of not less than twelve to twenty-four hours, the time varying according to the nature of the space to be disinfested.

. . . . . .

On the other hand Buxton, one of the great English authorities on this subject makes the following statement :—

"Occasionally under primitive conditions one may have to use burning sulphur in the absence of anything better, but it should be understood that it is not generally a good insecticide, quite apart from any damage it may do to fabrics, etc. In the great typhus epidemic in Serbia in 1914 and 1915 sulphur was of service as a rough method of killing most of the lice that were crawling about wards crowded with heavily infested typhus patients . . . . One might achieve the same effect with less trouble and disturbance by spraying floors and walls with kerosene, or with an emulsion of kerosene in soap and water. This emulsion is made by dissolving three parts by weight of soft soap in 15 parts of water. Kerosene (paraffin) such as is burnt in lamps is then added slowly with constant stirring, until no more will emulsify : the total quantity of kerosene depends on the particular type of paraffin employed, but it may greatly exceed the

quantity of soap and water. This concentrated emulsion, which keeps for long periods should be stored in bottles, and diluted 1:20 for use. It is a good general insecticide, cheap and harmless to man and domestic animals. Formaldehyde is of little use as an insecticide and should not be used either as gas or as a watery solution ('formalin')."

In the presence of typhus or trench fever (the transmission of which is by the dried faeces of the insect) it may be desirable to protect eyes and respiratory passages by a mask. It appears that the temperature which kills the lice is by no means sufficient to kill the trench fever virus in the insects' faeces.

A typhus hospital should be organised like a delousing station, incoming patients being stripped, bathed and disinfested before passing to the wards.

It is frequently necessary to improvise apparatus for delousing clothes and blankets on a large scale. Much may be done with railway vans, heated by steam from a railway engine and provided with racks. If chambers heated with braziers are used, they should be partly underground, and the excavated earth may be used to increase the insulation of the walls. The most crude and primitive type of disinfestor employed by the Serbian people was made by digging holes upon sloping ground for ovens and lining them with bricks or stone. In these ovens fires were lighted and the opening closed by a wooden cover or by a metal one if metal was available. After a short time the fire was scraped out and the clothing to be disinfested placed in the oven on a grating and the opening again closed with the cover. The Serbians became very expert in judging the degree of heat requisite to kill the lice and their nits and yet not sufficient to injure the clothing by burning, by placing a piece of white paper in the oven and removing the clothes when the paper showed the first tinge of turning yellow from the heat. Doubtless, some will smile at this crude method of disinfestation, but a very important principle in connection with suppression of the epidemic was involved by such a practice. It demonstrated that individuals who would really undertake to carry out disinfestation in this patient manner above described, and under such obvious difficulties, were interested in protecting themselves from the disease and thus in putting down the epidemic. Large brick or concrete ovens with double walls of a single brick in thickness between which hot air circulated were constructed and used extensively in many of the smaller villages. In these the infested clothing was loosely placed or hung upon frames. These disinfestors, while they were obviously not entirely satisfactory, nevertheless usually accomplished in a crude way the desired purpose.

In the absence of a disinfestor, outer garments may be dealt with by careful use of hot flat-irons, one ironer being required for

each man who is going through a delousing station. On a small scale, tanks, barrels, and even water-proof sacks, provided with racks inside and filled with steam from above, are useful.

In a disinfestor the louse is killed by heat and it is immaterial whether the heat is supplied from steam or hot air. But on general grounds hot air is preferable, for it does not necessitate drying the garments afterwards, and it does not shrink woollen clothes or blankets as steam does. Moreover, with hot air the temperature need not be raised to the boiling point of water so that a considerable economy of heat, and therefore fuel, results.

Control of the louse brings an epidemic of typhus rapidly to an end. As long ago as 1876 Murchison observed that people might be protected from the disease by destroying lice.

It is by the infected insects' faeces, in which the micro-organism is so abundant that the infection is transmitted to man. The normal channel is probably through scratches or abrasions, but there is some evidence that infection may be acquired by the conjunctiva (rubbing the eyes with contaminated hands, etc.) and it is at least possible that minute particles of excrement (insects'), which must frequently be inhaled, might produce the infection through the respiratory passages. The recent work of Sparrow (1936), with animals and human volunteers, show that transmission by inhalation is at least a possibility. (Buxton).

"That typhus may be sometimes transmitted by some other means than by the louse is a view held by a considerable number of physicians who have had during the war (1914-'18) an unusual experience during epidemics, though little credence is given to this idea by some investigators who have no such experience and who have formed their judgment that the louse is the sole transmitter from the louse transmission experiments recorded in the literature.

Granting that the spread of the disease in epidemics is due to louse transmission, and that our methods in combating successfully this disease in epidemics need only be directed against such a means of transmission, nevertheless, it must be borne in mind that this does not exclude exceptional instances of infection by other means." (Strong).

TYPHUS FEVER.

"Another type of disinfestor that was introduced into Serbia by Colonel Hunter and Colonel Stammers, and employed particularly by them in the work of their unit at Kraguevatz and Mladenovac, was termed 'the Serbian barrel.' The top and bottom of a barrel was knocked out and a grated wooden bottom and a flat wooden lid provided. A short trench was dug in the ground which would accommodate a shallow circular metal tank or boiler with sufficient space

for a fire beneath. The metal boiler was placed on two iron bars resting upon the sides of the trench, and it was constructed of the same diameter as the bottom of the barrel which rested upon it. To complete the fireplace in which wood or coal was used, a chimney was sometimes placed at the further end of the trench. After the fire was lighted the clothes were placed in the barrel and the cover held down by a few stones during the process of disinfesting. As Nuttall has remarked, this arrangement might serve as a makeshift but it has drawbacks which need not be emphasized. However, as I have pointed out, it was necessary in Serbia to employ all possible makeshift methods. While the barrel method of disinfestation was nevertheless moderately satisfactory for the individual it was found to be more desirable to construct, whenever possible, stationary and permanent delousing stations where a larger number of people could be dealt with. Disinfestation of clothing by hot flatirons was employed very little, if at all, in Serbia.

For the disinfestation of very large numbers of people and their clothing in a short space of time, the establishment of sanitary trains was found to be a particularly efficacious method. The disinfection of railroad freight cars and of clothing and blankets in them by steam from the engine in connection with the suppression of epidemic diseases had been employed in Manchuria in 1910 and later in Germany, and freight cars arranged as steam disinfestors were known to be in use in Germany early in the year 1915. The efficacy of the sanitary disinfesting train units we employed in Serbia was, however, due particularly to the chief engineer of the Serbian railway service who displayed considerable ingenuity in directing the conversion of the cars for this purpose. As employed by us in Serbia these sanitary train units consisted of three cars, one of which was occupied by a large engine boiler for supplying the steam ; a second car, a large refrigerator one, was made air tight, felt being placed at the edges of the side door, and a connecting steam pipe was so arranged that steam from the boiler could be turned into it under low pressure, the ordinary system of pipes in the roof of these cars, finely perforated, being also thus connected up with the boiler engine, the steam passing from these fine perforations downward and through the car The clothing was hung loosely in the car on wire suspended from hooks. Both lice and ova on the clothing were killed in a very few minutes in this manner, as was shown by repeated tests carried out by Dr. Thomas Jackson, Chief Sanitarian of the American Red Cross Commission. In a third large car shower baths were constructed with a reservoir for water above. These sanitary trains were run upon railroad sidings and large tents were erected near them. The people marched to the tents, several hundred at a time. Usually their hair was clipped, and then, after undressing, their clothing was placed in the steam sterilizing car. They next passed to the car in which the shower baths were placed, and, after a thorough scrubbing with soap and water here, they were sprayed with kerosene as an

additional precaution for killing the vermin and then received either sterilized clothing or new clothing."

The following is a description of the precautions adopted by the American Red Cross Mission to Poland in 1920 :—

TYPHUS FEVER.

(American Red Cross Mission to Poland, 1920.)

"All cases admitted to our Division were submitted to a second delousing process more complete than that practised on admission to the hospital. To this we attribute the non-occurrence of typhus in workers and visitors to our wards. Each patient was stripped on a stretcher on which he was brought to the Division and all clothes and bedding brought with him were returned at once on the same stretcher to the ward from which he came. On a special table covered with a white rubber sheet all body hairs were clipped close below the nit-bearing level and this clipping was supplemented by shaving about the pubes and anus where body lice as well as pubic lice were often found concealed in the hair. The sheet was then removed with all hair carefully folded in it, and the hair washed into a pail and boiled. The patient was then bathed thoroughly with soap and water with the exception of the head. After drying, the head, axillae, and the pubic and anal regions were treated with a mixture of kerosene and "lightwood oil,"[1] equal parts, which was also rubbed more lightly over the remainder of the body. The heads of patients were clipped and treated with oil without washing since we found reason to suspect that wetting the deep layers of dandruff on the scalps of some interfered with the penetration of the oil and allowed lice to survive. The head was finally tied up in a cloth cap to retain the oil, the patient was given clean pyjamas or night-shirt and carried on a wheel-stretcher to his bed.

This lousing process was performed either by typhus-immune orderlies or by nurses in full protective dress, in each case under the supervision of physicians. All who worked in the wards wore special louse-proof gowns with closed stocking-footed trousers closely sewed beneath the skirt of the gown about the waist. After each

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[1]"Lightwood oil" is a light tar oil produced from wood by the Department of Propellants, British Ministry of Munitions, during the war. It was recovered from the top of crude pyroligneous liquors produced in the distillation of wood. It is not an ordinary product of commerce. Its efficiency according to Mr. Bacot is probably due to the presence of creosote, a low surface tension, and possibly an acid reaction. Mr. Bacot has obtained favourable results from experiments in which he tested the effect of "lightwood tar oils" obtained in commerce upon pediculi. They were cheap and efficient. They were used pure, or usually, mixed with other oils.

day's wear all gowns were deloused by placing them in galvanized iron cans with a generous sprinkling of crude flake naphthalene over each gown to stand undisturbed until the following day. This method was proved to be efficacious by repeatedly placing control boxes of lice among the gowns ; when the gowns were removed the lice in the boxes were always dead.

In delousing, bathing and bedmaking or in other work involving special possibilities of exposure rubber gloves fitting closely over the wrists of the gown were worn, and the wrists and neck-opening of the gown were sprayed with cedarwood oil as a repellent. The nurses wore cloth head-coverings to confine the hair. All who worked in the wards were warned to be on the lookout for lice and to conduct themselves as if lice were known to be present. It was also found necessary to delouse the Polish ward-maids and orderlies, and to inspect washing returned from outside laundries.

As precautions against transmission of complicating diseases from one patient to another cups, dishes, mouth-cleaning instruments, linen, and excretions were treated as in typhoid. In bedmaking and general care of patients the usual practice of American hospitals was followed as a practical demonstration of American methods."

ORDER

entitled

EMERGENCY POWERS (No. 46) ORDER, 1940.

The Government, in exercise of the powers conferred on them by the Emergency Powers Acts, 1939 and 1940, and of every and any other power them in this behalf enabling, hereby order as follows :—

1. This Order may be cited as the Emergency Powers (No. 46) Order, 1940.

2. In this Order the expression "the Minister" means the Minister for Local Government and Public Health.

3. (1) Whenever the Minister is of opinion that a particular person is a probable source of infection with any disease and that the compulsory isolation of such a person is necessary or expedient in the interests of public safety, the Minister may by warrant under his hand order the detention and isolation of such person until a medical officer specified in such warrant has certified that such person is no longer a probable source of such infection.

(2) Whenever the Minister has by warrant under this Article ordered the detention and isolation of a person, such person shall be detained and isolated accordingly under this Order, and for that purpose any member of the Garda Siochana may without warrant arrest the said person.

(3) Whenever a person is detained and isolated under this Order, there shall be furnished to such person, as soon as may be after he arrives at a hospital or other place of detention and isolation directed in that behalf by the Minister under Article 4 of this Order, a copy of the warrant issued under this Article in relation to such person.

(4) Every warrant under this Article shall be in the form set out in the Schedule hereto or in a form to the like effect.

4. Every person who is detained and isolated under this Order shall be so detained and isolated in such hospital or other place as the Minister shall specify in the warrant by which such detention and isolation is ordered and in such manner and under such conditions as the Minister shall from time to time direct.

5. (1) Whenever a person is detained and isolated under this Order in a hospital or place of isolation, the persons having control of such hospital or place shall cause the clothing of such person to be disinfected or, where necessary for the purpose of preventing infection, destroyed and replaced by other clothing. (2) A person detained and isolated under this Order in a hospital or

place of isolation may be required by the persons having control of such hospital or place to take a bath on admission. (3) Every person detained and isolated under this Order shall submit himself in a peaceful and orderly manner to the exercise in respect of him of all or any of the powers conferred by the foregoing paragraph of this Article.

6. The Minister may, by writing under his hand, if and whenever he thinks proper to do so, order the release of any person who is for the time being detained and isolated under this Order, and thereupon such person shall forthwith be released from such detention and isolation.

SCHEDULE.

FORM OF WARRANT UNDER ARTICLE 3.

Emergency Powers (No. 46) Order, 1940.

In exercise of the powers conferred on me by Article 3 of the Emergency Powers (No. 46) Order, 1940, I ... ... Minister for Local Government and Public Health, being of opinion that ... ... is a probable source of infection with ... ... and that the isolation of the said ... ... is necessary (**or** expedient) in the interests of public safety, do by this warrant order the detention and isolation of the said ... ... at..... under the said Article 3 until ... ... Medical Officer has certified that the said ... ... is no longer a probable source of such infection.

GIVEN under the Official Seal of the Government this 27th day of August, 1940.

(Signed) EAMON DE VALERA,

Taoiseach.

BRUCELLOSIS (Undulant Fever).

"The diagnosis of Undulant Fever is one which is not likely to be made by a practising physician who is unacquainted with the disease. A recent case in America in which the patient was variously diagnosed as suffering from malaria, typhoid, streptococcal infection and influenza for a period of several weeks, illustrates how such cases may be wrongly diagnosed." (Ross, 1927).

Nor is the problem unimportant, because in spite of its low mortality-rate the disease causes such prolonged disability in many cases that it represents a serious economic loss in countries where the malady is common.

The term "Brucella" is now applied to a tiny microscopical organism or group of very closely related organisms, known at varying periods as Micrococcus Melitensis, Bacillus abortus of Bang, B. abortus suis, equi etc.. The designation 'Brucella' was bestowed on this group in honour of Bruce who in 1887 discovered the microorganism in the spleen of a patient dying of Malta fever, and later cultivated the organism in vitro. It was found at a subsequent period that very similar organisms caused infectious abortion in cattle and other animals, and it is convenient to refer to these maladies under the general term 'Brucellosis' just as the term 'Enteric' is used to denote the typhoid and para-typhoid group of fevers.

It is worth noting that when it was discovered that goats in Malta were heavily infected with the disease and excreting the organisms in their milk, steps were taken by the British Army and Navy in 1906 to stop the supply of goats' milk to the troops. The result was impressive. Within a year the disease, which had been very prevalent, was practically eradicated. The same result could be achieved by boiling the milk before use, and forbidding the consumption of such articles as cream and cheese obtained from the raw milk.

It may be said that the essential pathological changes associated with the disease are of a chronic inflammatory character, and resemble those of tuberculosis, often to a startling degree, both in character and focal dissemination.

Undulant fever, 'brucellosis hominis,' has in all probability afflicted mankind for many centuries, but the disease was shrouded in obscurity until the discovery of the Micrococcus Melitensis by Bruce. The importance of this disease may be indicated by the estimate placed upon it by Charles Nicolle, a profound student of the disease of the Mediterranean littoral. Nicolle wrote ;—"Mediterranean (Undulant) fever in the course of evolution, and is tending to become chronic. It is a malady which, on account of its manifestation and chronicity, will become one of the most common and stubbornest diseases . . . . Mediterranean fever is a disease of the future." (Nicolle).

Giltner (Michigan) : This is a disease that belongs to the future, a disease that is not well understood by anyone unless it is the specialist who has worked with it for a long time."

The true host of Br. melitensis is the milch goat. This fact was discovered by Zammit, a member of the Mediterranean Fever Commission in 1905. The organism appears to localise in the udder, spleen and lymph nodes of the goat, giving rise to an interestitial mastitis and splenic lymphadenitis. It has also been recovered from the milk of infected cows in the United States, France, Italy, and from aborted fetuses from sheep and goats in France and Italy.

Brucella abortus (Bang) was first isolated and described as a bacillus by Bang assisted by Stribolt in 1897. They isolated the organism from fetuses and fetal membranes of cows that had aborted and later established the fact that it was the cause of infectious abortion of cattle. The disease (in cattle) is now recognised as "Bang's abortion disease."

The udder of the cow as the reservoir for 'Brucella abortus' was discovered simultaneously by Smith and Fabyan and Schrolder and Cotton through the examination of milk of infected cows.

'Brucella suis' was first isolated by Traum in 1914 from fetuses expelled prematurely from sows. The hog appears to be the true host for 'Brucella suis' and the other two species of 'Brucella' do not appear to infect the hog naturally. Up to the present time 'Brucella suis' has been isolated from hogs in only the United States, Hungary and Denmark. 'Brucella suis' has been isolated from the horse, the fowl, the cow and the dog, all of which were naturally infected. The malady is not considered to be an essentially abortion disease in swine. Rather is it a splenic lymphadenitis.

Natural 'Brucella' infection in animals takes place either by way of the mouth or through the skin.

BRUCELLOSIS IN ANIMALS.

The Department of Agriculture for Eire (Leaflet No. 13) states : "With the possible exception of tuberculosis, there is no disease of animals which causes such extensive losses to the dairy farmer as contagious abortion." Again the Ministry of Agriculture for Northern Ireland has carried out tests on blood samples and other material from cattle, as the result of which it has formed the definite opinion that contagious abortion is probably the most important disease of cattle in Northern Ireland, and is widespread throughout the area. The proportion of animals in any particular herd which may be suffering from the infection is variable, but infection spreads quickly in a herd unless special precautions are taken, and it is difficult to eradicate, though it can be done.

Leaflet No. 13 mentioned above, gives some very useful information as to prevention of spread of the disease in farm stock.

The disease is most commonly introduced into a clean herd by the purchase of an infected cow or heifer. The infected animal may abort or even calve at full time ; in either case she discharges large numbers of abortion bacilli, which are apt to contaminate the food and litter of contact animals, and thus become the starting-point of an outbreak. It is known that the germs of the disease may live on the pasture under ordinary weather conditions for a period up to six months, and if the first case of abortion takes place when cows are at pasture, the results may be serious owing to the opportunity afforded for the infection to spread. The infected cow for a short time before aborting or calving, and for a few weeks afterwards while she is discharging infective material, is the main source of infection. Linked with the infected cow is contaminated food, the ingestion of which by susceptible animals completes the usual cycle of infection. When a case of contagious abortion has occurred or even is suspected, it will be necessary immediately to adopt strong measures. The two chief points to be kept in mind are (1) Isolation and (2) Disinfection.

As the disease is mainly spread by uterine discharges of infected cows soiling food and litter, infected animals are particularly dangerous for a day or two before and for two or three weeks after aborting. During this period aborters and "carriers" should be kept in strict isolation, and the stock-owner could do nothing more useful to arrest the spread of the disease than to set aside one or more loose-boxes provided with good sanitary conditions for this purpose. The aborted calf, after-birth and all soiled litter should be burnt or buried in quicklime, and any part of the premises which has been soiled by discharges should be disinfected.

Isolation must be very rigidly carried out. The suspected or affected animals should be kept from contact with healthy cows or heifers until all discharges cease, and they should not even be permitted to graze over pastures which are likely to be used within some months for other breeding cattle. In the case of housed cattle, it is advisable, where possible, to secure the services of a separate cattle man to attend the infected animals, otherwise infection may be readily carried to healthy animals.

Under the Epizootic Abortion Order of 1925 it is an offence against the Diseases of Animals Acts, entailing heavy penalty, for any person to expose in a market, fair or saleyard any cow or heifer which has calved prematurely within the two months immediately preceding, or to allow such cow or heifer to graze on common or unenclosed land, or on the side of a highway, or on any land on which there are cattle which are not the property of the owner of the infected cow or heifer.

Two-thirds of the cases of human undulant fever in Denmark have been traced to contact with infected cattle.

Undulant Fever. ("Huddleston—Brucellosis.")

It is now a well established fact that all three species of **Brucella** are pathogenic for human beings. (Brucella melitensis, Brucella abortus, Brucella suis). Data in support of this fact have come from workers in North and South America, the British Isles, and many European countries.

Human beings may become infected by way of the skin through contact with infected animals and their excretions, or by way of the mouth through the ingestion of raw dairy products which contain the living organism.

The disease in human beings due to **Br. melitensis** was given the descriptive name "undulant fever" by Hughes in 1897. In the minds of many it is a question to whom credit should be given for describing the first case of undulant fever in man due to **Br. abortus,** and the first case due to **Br. suis**; the early methods in use for differentiating these two species were by no means satisfactory. On the basis of more recent and more accurate methods of differentiation, it appears that Duncan was the first to isolate **Br. abortus** from man and Keefer was the first to isolate **Br. suis** from the same source.

The clinical symptoms and signs of undulant fever are extremely variable and complex; so much so that it is difficult for the clinican to make a diagnosis of the disease without the aid of laboratory tests.

Hughes and many students of the disease since his time have described four types of undulant fever, namely, the malignant, the intermittent, the undulatory, and the ambulatory. To these four types may be added the subclinical and chronic types. It is often difficult to distinguish one type from another as there is a tendency for the disease to change in type as it progresses.

The malignant type of infection rarely occurs in the United States. It has been encountered in the Maltese Islands more often in the past three years than in former years. It is characterised by a short acute course, high sustained temperature, extreme prostration, severe pains in the muscles and head, and delirium. This type of infection usually has a fatal termination. The average duration is about three weeks.

The chief difference between the intermittent and undulatory types is the occurrence, in the latter type, of periods in which there is no elevation of temperature or clinical symptoms of the disease. The chief symptoms and signs which characterise these two types of the disease are weakness, loss of appetite, occipital headache, sweat-

ing, chilliness, pains in the back, joints, muscles, and abdominal region, cough, constipation, insomnia, frequent and persisting nose bleeding, intermittent and remittent fever, loss of weight, enlarged peripheral lymph glands, anaemia, and leucopenia. **The duration is from three weeks to eighteen months.**

The ambulatory type is not characterised by any particular chain of symptoms or signs. The patient is rarely ill enough to be confined to bed. The most frequent symptom is short periods of lassitude in the afternoon and evening. There is an occasional night sweat. The temperature may be elevated from 96.6° F. to 101.6° F. in the evening.

The subclinical type is so mild and of such short duration that it usually passes undiagnosed. The patient may complain of occipital headache, weakness, general aching, and loss of appetite. The temperature may reach an elevation of 103° F. in the evening. The duration is from three to seven days.

The chronic type of infection frequently goes unrecognised due to the fact that the complexity of symptoms which characterise it has not yet been fully realised. There is much evidence that indicates that many cases of the chronic type have emerged from the undulatory and intermittent form of the disease. The symptoms that are usually observed in the chronic form are : asthenia, nervousness, lack of emotional control, and melancholia. A few patients show symptoms not unlike those which characterise epidemic encephalitis. The temperature of the patient seldom, if ever, goes beyond 101.6° F., and there may occur long intervening periods in which it remains normal. The duration of the chronic form is from three months to several years.

The length of time between exposure and the first onset of symptoms in undulant fever may vary from seven to twenty days.

DIAGNOSIS.

The most valuable serological method of diagnosis in man is the 'agglutination reaction' (similar to the Widal reaction of the blood-serum in typhoid fever). This reaction is usually given by the sera of patients suffering from undulant fever after the second week of the disease, though sometimes as early as the fifth day. The test may remain positive for periods varying from three months to a year, and though very valuable is considered not to be quite so reliable as the Widal test for enteric fever.

There are two satisfactory methods available for isolating 'Brucella' from infective milk from any species of animal. (Huddleston).

(1) **Guinea-pig inoculation method.** If an individual animal is to be examined for the presence of 'Brucella' in her udder, the milk

should be collected at or near milking-time. The teats should first be wiped with a clean damp cloth. The first two or three streams from each quarter should be discarded. Samples of milk for examination may now be taken from the hind quarters in one sterile test-tube and from the front quarters in another sterile test-tube. About 15 c.c. of milk in each tube, or 7.5 c.c. from each quarter, is sufficient for examination. The bacteriologist allows the milk to stand for 24 hours to permit the cream to rise to the surface. The cream carries with it the majority of the organisms in the milk. The entire cream layer of each sample may be injected intraperitoneally or subcutaneously into a healthy guinea-pig. The inoculated guinea-pigs are placed in individual cages and killed at the end of six weeks.

If bottled market milk is to be examined the entire cream layer is removed from the top of the milk by the bacteriologist, placed in a sterile tube or flask and mixed thoroughly. One may inject a guinea-pig either subcutaneously or intraperitoneally with 2 c.c. of the cream.

(2) **Direct culture method.** The milk samples are collected in the same manner and with the same precautions as for guinea-pig inoculation, and sent to the bacteriologist.

Blood for culturing 'Brucella' may be collected at any time during the pyrexial period. 'Brucella suis' and 'Brucella melitensis' are easily cultured from the blood of the infected animal. For some reason not yet known **it is difficult to obtain 'Brucella abortus' from human blood.** The latter species grows out very slowly, if at all, in the inoculated broth.

Urine. 'Brucella' has been cultured but very few times from the urine of infected human beings and infected cattle. The organism is easily obtained from the urine of naturally infected goats.

Faeces. Very few workers have succeeded in isolating 'Brucella' from the faeces of infected human beings or naturally infected animals.

If **milk samples** are sent to a laboratory for examination and if more than ten hours intervenes before their arrival, they should be iced. Traum found boric acid (1%) an excellent preservative for milk samples. If this agent is used, icing of milk samples is not necessary.

In many humans and goats that have been found infected with 'Brucella' the blood agglutination test may be negative even after repeated tests. A negative test therefore does not always mean that infection is absent.

All blood specimens should be properly identified with labels at the time of collection, and if they are to be sent to a laboratory,

every effort should be made to have them arrive within 24 hours after they have been collected. This prevents the occurrence of haemolysis and decomposition of the blood, which are apt to interfere with the results of the test.

Zammit demonstrated the presence of agglutinins in the milk of infected goats as well as in their blood.

Milk Samples.

But in the collection of milk samples, sour and decomposed milk should not be used, as the results are not reliable. Neither should milk be used in which the curd has been partly digested as this interferes with the test. Colostrum is unsatisfactory because of the difficulty of separating the clear serum.

In the examination of the gravid uterus, fetal membranes and fetus for evidence of 'Brucella' infection, one should note the presence in the utero-chorion cavity of a sticky, brownish, odourless exudate resembling soft caramel candy. This material consists of a collection of cellular debris containing 'Brucella' in pure culture.

It was thought advisable to give the foregoing summary of some important details in view of the fact that a definite case of the disease occurred in this county in October, 1940. Dr. O'Leary has kindly supplied me with the following excellent clinical history of the patient from the inception of his illness :—

Male. Farm labourer ; Age, 20 years.

Previous good health.

His illness commenced on Tuesday, 29th October, 1940, when he took ill with malaise, shivering, headache, and sore throat. He thought his condition to be a "cold" and remained in bed. Then on Friday, 1st November, he sought medical advice.

1st November he complained of the above symptoms and also of anorexia, constipation and insomnia. On examination, his face was flushed, he was hoarse, his throat displayed a general rawness but no tonsillar enlargement or infection. He had a slight cough with sputum. No physical signs of disease of lungs. Temperature 102. Pulse 80. Respirations 20. On examination of abdomen an enlarged spleen was found.

On the 4th and 6th November his condition remained the same—pyrexia continued and pulse slow.

On the 9th November condition slightly improved. Temperature 100. Pulse 80. Spleen still enlarged. Complained of Urine being reddish.

On the 11th November condition much the same as on previous visit.

Urine examination: Deposit of urates and trace of albumin.
On 13th commenced course of Soda Salicylate but his condition did not yield to this treatment.

On 17th, Temperature 98. Pulse 72. His condition otherwise the same—he complained of malaise, sweating. Spleen enlarged.

On 19th November. Temperature 103. Pulse 100. Throat slightly sore and was hoarse. Spleen enlarged. Urine examination: no deposit of urates and no albumin. (Suspected Abortus fever and gave warning as to disinfection of faeces and urine).

On 21st November felt slightly better. Temperature 99.5. Pulse 72. No soreness of throat—complained of cough and sputum in the mornings.

On the 25th November. Temperature 103.5. Pulse 120. He got up contrary to advice, says he felt a little stronger.

On 28th November. Temperature 102. Pulse 80. Spleen enlarged and complained of malaise. Took specimen of blood for agglutination with Brucella abortus.

On 3rd December. Temperature 100. Pulse 100. Condition showing no great improvement.

On 4th December received blood report. Strong agglutination reaction to Brucella abortus in a dilution of 1/2,500. Sent to Fever Hospital, Letterkenny, that evening.

Since admission to Fever Hospital condition much the same.

I saw the patient in hospital on the 14th December, 1940, and made the following notes :—

History of Present Illness. The patient has been ill about six weeks, his sole complaint being weakness, after an initial bout of malaise, shivering, headache and sore throat . He was on his feet for some days before he took to his bed. He says he has had no pains nor aches. His sole complaint was, and is, weakness. He has been constipated since the start of his illness, and sweated a good deal for the first two weeks. Dr. O'L. noted an enlarged spleen in November, 1940.

Present Condition (14-12-'40): Appetite good. Looks well. No Insomnia now. Muffled 1st heart sound. He has failed a little. Temperature and Pulse normal. Tongue slightly furred. Blood count :—No anaemia—lymphocytosis present.

DISEASE

Fever Abortus

Notes of Case

Name { C D

Age 26 years

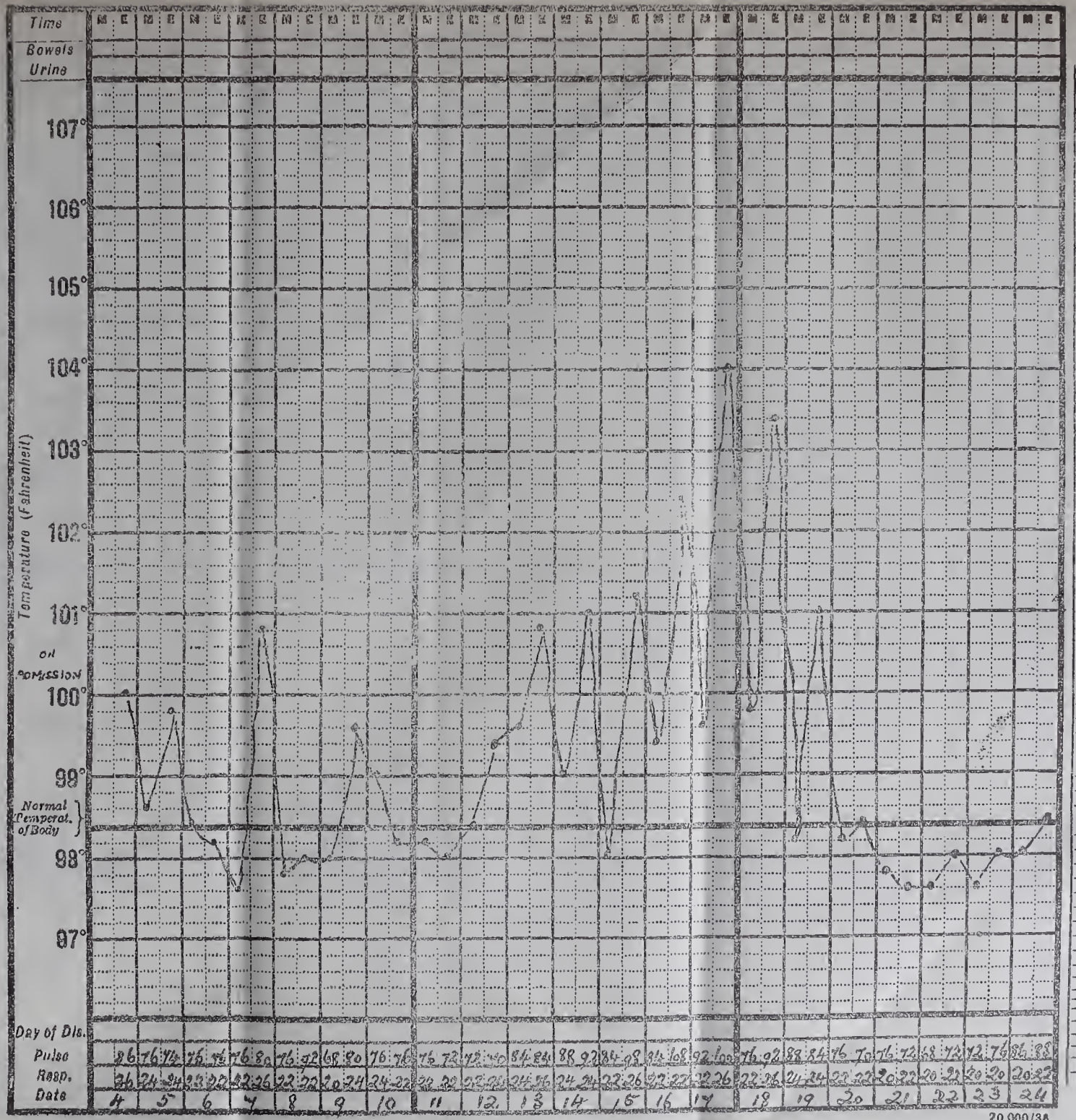
Diet

Case Book No.

Date of Admission

4th December 1940

Result



20,000/38

Family History. Father, mother and three brothers at home—one of these works with patient's employer. The latter supplies milk to the patient's family.

Previous History. Not important.

Source of Infection. Patient, when questioned, says he heard vaguely that a cow of his employer aborted last year, but he does not know anything about it. No illness in his employer's family as far as patient knows.

When I saw the patient on 14th December, 1940, he felt quite well and both temperature and pulse were normal. The spleen was palpable. After a few days, however, he developed a temperature and had a bout of fever for over a week. He returned to normal, and has, apparently, been well since.

He was discharged from hospital on 11th January, 1941.

The following are the relevant pathological findings :—

2-12-'40—Blood agglutinated Br. Abortus 1/2,500 (Dr. O'L.)
17-12-'40—Urine negative for Br. Abortus.
19-12-'40 Blood agglutinated Br. Abortus 1/2,500 (in hospital).
20-12-'40 Blood culture negative.
14-12'40—Blood count showed lymphocytosis (54%).

The differential blood-count was as follows :—

Polys.	54%
Lymphs.	43%
Mono.	2.5%
Mast	0.5%
Total of WBC — 7,000	

The patient's temperature chart while in hospital is here reproduced, as it shows, to some extent, the undulatory character of the fever.

On February 8th, 1941, Dr. O'L. informed me that, as far as he could determine the patient's employer had had a heifer which aborted two years ago. She was subsequently fattened and sold. The doctor re-examined the patient in February, 1941, and reported as follows :—"He is back to normal health again, and no enlargement of the spleen can now be felt."

General Considerations.

Captain Dalrymple Champneys made an exhaustive investigation of the disease in his own country for the English Ministry of Health in 1929, and summarised the results as follows :—

(1) Undulant fever, which was regarded thirty years ago as a sub-tropical disease almost entirely confined to the Mediterranean littoral and islands, has now been recognised in every continent (except Australia) and under climatic conditions ranging from that of Alaska, which invades the Artic Circle to equatorial Africa. The disease (or its recognition) is, moreover, steadily extending.

(2) The agents of its spread, limited originally (in all probability) to the goat and perhaps man, now include sheep, cattle, horses, dogs and other animals.

(3) The infective organisms which have been shewn to cause undoubted undulant fever (indistinguishable from the disease formerly known as "Malta Fever" or "Mediterranean Fever") are not all precisely similar to the micrococcus described by Bruce, but can be divided by various tests into different groups, all of which are closely allied and can be regarded as belonging to a single genus and, perhaps, a single species.

(4) Some of the microbial groups just mentioned not only cause undulant fever in man, but have been proved to be the cause of an extremely widespread animal disease, best known for its effects upon bovines, named "contagious abortion," and there is now overwhelming evidence to shew that human beings can acquire undulant fever through contact with animals so affected or by the consumption of raw milk and other foods derived from them.

(5) Contagious abortion of cattle is known to be extremely prevalent in this country, though no statistical evidence as to its incidence is available, and it is the cause of very serious financial loss to cattle-breeders.

(6) It is known that cows infected with contagious abortion often become chronic carriers of the infective organism (even though they may never abort) and continue to excrete it over very long periods in their milk, either continuously or intermittently.

(7) The proportion of English milk which contains the Brucella abortus (the casual organism of contagious abortion) is not known, but in an examination of 488 samples taken from the milk supply (unpasteurised) of a large town, it was found that 5.7 per cent. of "single" milks and 8.8. per cent. of "mixed" milks contained the organism. Similar results, but indicating a wider infection, have been reported from other countries.

(8) The treatment of infected herds by vaccination with living cultures of Br. abortus is very popular in some countries, and is generally regarded as having a prophylactic value in certain cases, but there is evidence suggesting that this practice may not be free from danger, since the animals so infected may become chronic carriers of the disease and continue to excrete the infective organism in their milk over long periods. The policy of cleansing herds of contagious abortion by the elimination and exclusion of reactors to the agglutination test has proved very successful, both in this country and in America, is entirely free from danger, and is considered by many observers as being preferable to vaccination.

(9) In the process of pasteurising milk the casual organism of undulant fever is destroyed. (Pasteurisation does not, however, solve the problem of prophylaxis in this disease, as the process cannot be satisfactorily carried out in many country districts and it does not remove the danger of infection by direct contact).

(10) Only 14 well authenticated cases of undulant fever originating in England have been found in the literature, and in only three of these was there good evidence of the source of the infection, in one case goats' milk, and in the other two cases, cows' milk, the organism in each case being probably of the abortus variety. In view of the experience of other countries (United States, Denmark, Sweden, etc.), however, one should be very cautious of assuming that this represents the true incidence of the disease in this country .

(11) The recognition of the disease on clinical grounds is often very difficult, but the diagnosis can nearly always be established by means of laboratory methods. The agglutination test is particularly valuable, and a titre of 1 : 80. or over, can probably be accepted as definite evidence of infection (past or present).

It is seen, therefore, that undulant fever of endemic origin is almost unknown in this country, though cases are being recognised in increasing numbers in countries where it has been known to exist for many years. Moreover, of those countries which have hitherto been considered immune, one after another is reporting the discovery of unsuspected cases. Does this mean that the disease is spreading, or merely that diagnosis has improved ? Probably both factors are concerned. Kristensen, reviewing the series of cases detected by him in Denmark, says, " As the presence of abortus bacillus infection among human beings was quite unknown in this country until these examinations took place, there is no reason to suppose that this infection has been especially frequent within the last few months. What has happened is that some of the feverish infections which previously had either not been diagnosed or wrongly diagnosed, were now correctly diagnosed. There is no reason to believe that this infection is more widespread here in Denmark than in countries where cattle-breeding is carried on to the same extent ;

it must be supposed that if systematic enquiries of a similar nature were set on foot in Germany and in England the same conditions would be found."

Since Kristensen wrote these words cases of human abortus infection have been reported from Germany in increasing numbers and whether such discoveries are waiting to be made in England can only be ascertained by the institution of similar enquiries. The possible explanations of the apparent almost complete immunity of this country have already been discussed, but a few of the points may be recapitulated here. There is certainly no doubt as to the prevalence of contagious abortion of cattle in England. Why therefore, should infection of human beings by the consumption of milk from infected cattle, or by other means, fail to occur as it has done in other countries? The argument that, if the contagious abortion of English cattle could set up undulant fever in persons drinking the infected milk, then a large number of human cases would already have been recognised, is not conclusive, as a similar argument was employed in the United States before the use of the agglutination test with Br. abortus became general. It may be well that, as has been found in other countries the great majority of the cases here are of the ambulant or mild types. In any case, as has been shewn, the disease is usually difficult to diagnose, unless agglutination tests with the specific organism are carried out in all cases of obscure continued or intermittent fever, and it is almost certain that the possibility of its existence is unknown to, or not taken seriously by the majority of the doctors in this country

Finally, supposing that this country is really practically free from the disease can one be confident that it will remain so?

The problem is one of some importance, as undulant fever, though characterised by a low mortality rate, is nevertheless responsible for a serious amount of sickness and financial loss in those countries where it is prevalent. Aublant and his co-workers stated in 1925 that they were inclined to believe that the virulence of the two species of the genus Brucella was in a perpetual state of flux, that little by little their pathogenic power had shifted, and that the cases of bovine contamination reported in Italy and Africa, though then exceptional, would become frequent in the future at a period more or less remote. Such a possibility as it affects this country cannot wisely be ignored.

What steps then should be taken to ascertain the true state of affairs? One cannot do better than be guided by the experience of other countries and employ the same methods that have lately produced such striking and unexpected results in the United States, Denmark and Sweden.

(1) There is no doubt that extremely valuable information might be obtained by the following means:

(1) The careful investigation and report to the local or central health authority of all obscure cases of continued or intermittent fever with symptoms and signs suggestive of undulant fever or in which no other definite diagnosis could be made. In reporting such cases particular attention should be paid to any visits by the patient to foreign countries, the habits of the patient with regard to the consumption of goats' or cows' milk or products made therefrom, the presence of contagious abortion in the herds from which such milk is obtained, the duration of the illness and the character of the fever. The examination of the patient's blood for the presence of the specific organism and the agglutination reaction with the blood serum and a standard Brucella culture should be carried out whenever possible.

(2) The routine examination by the agglutination test (observing the precautions already referred to) whenever possible, of samples of blood sent for diagnosis in cases of continued fever, or even those submitted for the Wassermann reaction.

More recently (1939) Dr. Cunningham, Liverpool, described a series of nineteen cases seen over the preceding five years. In the course of the discussion of these cases, Professor Cohen recalled that in 1930, he had suggested that five main clinical varieties occurred: (1) the classical undulant form; (2) the arthritic. (3) the abdominal; (4) the genital of which orchitis was the essential feature; and (5) the "catarrhal jaundice" type. Since 1930 he had been impressed with other features, especially the occasional occurrence of severe haematemesis or melaena as an initial or early symptom; the occasional late development of agglutination tests against "Br. abortus"; and the absence of positive agglutination tests against "Br. abortus" and "Br. melintensis" is cases of pyrexis running a classical undulant course, when all other causes could be excluded and when the patient made a complete recovery.

Dr. M. H. Pappworth suggested two reasons why brucellosis infections were possibly being missed. First little attention had been paid in England to porcine brucellosis. No case of brucellosis of porcine origin had been reported in that country, although over a hundred such cases had been noted in the U.S.A. Secondly, clinicians usually regarded brucellosis infections as protracted fevers, but cases had been described of proved brucellosis infection in which the total pyrexial period was only ten days or less. In these cases the patients would have apparently recovered before the occurrence of demonstrable agglutinins in the blood. Might not some cases of obscure pyrexia lasting up to ten or twelve days and followed by complete recovery be examples of brucellosis?

The first laboratory investigation in a suspected case of abortus fever should be a leucocyte count. There is usually a slight leucopenia and relative lymphocytosis., although not so constant as in typhoid. If the count shows a leucocytosis, some other cause must

be sought for the pyrexia. The agglutination test naturally follows, and is usually conclusive. Blood culture, though difficult, should always be attempted.

INCIDENCE IN MAN.

Since the first proved case of infection by Br. abortus in man, cases of human infection with this organism have been reported in steadily increasing numbers from many countries. Dalrymple—Champneys in April, 1940, had collected a total of 494 cases in England and Wales, of which a total of 115 cases had occurred up to 1933, and of these 84 had been observed in 1930-'32. Up to the end of 1934, investigators had noted 97 cases in Scottand, with an average of 23 cases in each of the last three years. Creed considers that these figures are far less than the real incidence of the disease, and Wilson on the basis of laboratory data, estimates that "the incidence of undulant fever in England and Wales is probably of the order of 500 cases in a year." It is commoner in males than in females in the proportion of 2 to 1, is rare below the age of ten, and has its maximum incidence between the ages of thirty and sixty.

Influenza.

There were 91 deaths as compared with 86 last year. The disease started to assume epidemic proportions towards the end of the year. Sore throat was a common initial symptom, followed by pains of a scattered nature, and leaving the patient pretty well exhausted after four or five days illness. As far as can be gathered, a large number of the actual deaths occurred in older people who developed broncho pneumonia. On the whole the epidemic was of a mild type though very infectious.

Epidemic Diarrhoea.

The following circular issued by the Local Government Department outlines the salient points in the prevention of this easily preventable but fatal disease in young infants :—

(Department of Local Government and Public Health)
Custom House,
Dublin.
9th June, 1939.

P.H. Circ. 68-39.

EPIDEMIC DIARRHOEA.

PRECAUTIONARY MEASURES.

A Dhuine Uasail,

The Minister for Local Government and Public Health desires to direct attention to the marked increase of mortality from Diarrhoea and Enteritis amongst children under two years of age which invariably occurs in the third quarter of each year, and to the

importance of taking timely measures for the prevention of this cause of death. The disease often appears in epidemic form with little warning.

In point of incidence Diarrhoeal Diseases are associated in a special degree with urban conditions of domicile, with the second six months of the year, and with the second and third months of infant life. They display their maximum intensity as a cause of death during the months of August, September and October and are specially prevalent in seasons of high summer temperature. In regard to causation : Diarrhoeal Diseases may be due to food contaminated owing to disregard of cleanliness in the homes and in municipal arrangements or to the agency of flies as carriers of infection, and may arise from an unwholesome milk supply. It is noted that young children suffer particularly from the latter cause at the stage when they are changed from breast feeding to artificial diet.

For the prevention of diarrhoea it is most important not only to insist on domestic cleanliness, but also to secure that all accumulations of dust, refuse, or filth, about dwellings are removed at frequent intervals. This applies particularly to the contents of privies, manure heaps and ashpits and to the cleansing of yards passages and streets. In this way the breeding of flies, which are such potent agents in polluting food and drink, may be prevented. All practical measures for the destruction of flies, in order to prevent their access to food, should be taken. Shopkeepers might be asked to arrange that foods exposed outside shops or in shop windows, especially foods which are intended to be consumed without being cooked, should be kept suitably covered so as to prevent contamination by flies, wasps or dust. As required by the Milk and Dairies Regulations, 1936, strict attention to the observance of cleanliness (hands and clothing) on the part of milkers and thorough cleansing and scalding of utensils used for containing milk should be enjoined.

Receptacles for the storage of milk in dairies and in the houses of consumers should be always kept suitably covered. The practice observed in some districts of leaving uncovered vessels outside houses for the purpose of receiving the milk supply should be discontinued.

The Minister would suggest that where a Child Welfare Scheme is in operation, the organisation should be utilised for giving suitable warning regarding measures to be taken for safeguarding the children from food contamination. This could be done at sessions of Maternity Centres and through the domiciliary visits of Health Visitors. Information should also be obtained in the same manner as to the incidence of Diarrhoeal Diseases and advice given to call in medical assistance in case of an outbreak of disease.

TUBERCULOSIS.

Clinics and Attendances.

Clinics for the diagnosis, treatment and prevention of tuberculosis are held as follows :

Each fortnight—At Letterkenny, Carndonagh, Donegal and Glenties.

Each month —At Dunkineely, Carrick Ardara, Dungloe, Pettigo, Ballyshannon, Milford, Tamney, Carrigart, Buncrana, Clonmany, Muff Moville, Stranorlar, Raphoe, Lifford, Dunfanaghy, Falcarragh, Bunbeg, and Frosses..

Arranmore Island is visited as required by the local Medical Officer. In addition suspected cases are visited in their own homes at the request of their own doctor, or of any other responsible person interested, provided the dispensary doctor is agreeable.

Attendance at Clinics.

January	... 201	February	... 220
March	... 205	April	... 168
May	... 182	June	... 156
July	... 134	August	... 139
September	... 132	October	... 131
November	... 133	December	... 92

As mentioned last year, the examination of contacts is urged on all patients. Those contacts who are found to exhibit any clinical signs of disease are immediately X-rayed, and if necessary sent away for treatment. All contacts are kept under observation for varying periods of from six months to a year, and are periodically overhauled in order to detect any suspicious signs of disease.

The notification of a case of tuberculosis automatically gives rise to the following questions :—

(1) Where did the patient get his infection ?

(2) What is the state of health of his family and immediate contacts ?

It is, of course, very important to try and obtain the answer to question (1) above as other healthy people may be unwittingly in close contact with a dangerously infective person. It is often difficult to convince parents and relatives that tuberculosis must come from infection with the tubercle bacillus. The commonest cause of such infection is contact with a case of pulmonary tuberculosis who is coughing and spitting up tubercle bacilli, frequently in enormous numbers. Such a person may be totally unaware of his dangerous condition.

An arrangement has been made by the Board of Health whereby patients from the south of the County may be X-rayed by Dr. Daly in the Sheil Hospital, Ballyshannon, and those from the north by Dr. McGinley in Letterkenny Hospital. Both doctors have been working under this scheme during the year, and have given every satisfaction. They have been very co-operative in regard to convenience of patients, and the standard of their X-ray work has been very good.

The following table gives the annual notification of all forms of tuberculosis in County Donegal, together with the separate figures for deaths from pulmonary and non-pulmonary forms :—

Year	Notifications	DEATHS REGISTERED.		
		Pulmonary	Other forms	Total
1930	246	151	45	196
1931	150	122	35	157
1932	98	111	43	154
1933	89	120	30	150
1934	91	103	38	141
1935	80	106	36	142
1936	75	107	20	127
1937	59	93	35	128
1938	65	100	34	134
1939	73	101	27	128
1940	80	108	39	147

The number of deaths from tuberculosis (all forms) in 1940 was 147, giving a death rate of 1.0 per 1,000 as compared with 0.9 per 1,000 last year. This increase is slight, but will possibly be maintained and even exceeded in 1941, as the hardships imposed by the world war increase in severity, even in non-belligerent countries.

The total number of new cases of tuberculosis notified in 1940 was 80. In addition 14 children were seen at School Medical Inspection of whom 4 were suspected to be cases of non-pulmonary tuberculosis. They are under observation. Of the remaining 10, three were contacts and 6 were placed under observation for suspicious symptoms. One of these latter, J. E., age 15 years, male, had been in Peamount Sanatorium in 1936. His X-ray report (24-12-1936) was obtained and was as follows :—

> "Right Hilum and mediastinum well-marked with enlarged glands. The right middle mediastinal glands are suggestive of early tuberculosis infection."

This patient was re-X-rayed on 14-4-1939 and the report was as follows :—

"The mediastinal enlargement is still present, but I would consider recent film a very marked improvement. With continued care and attention for a while, there is every prospect that tuberculosis of the lungs will not result."

Another of these six, M.J.B., female, age 7 years, was X-rayed on 11-1-1941, and the following report obtained:—

"There are small areas of inflammatory reaction and consolidation of the branches of the upper right zone, with enlargement of the hilum glands. This must be regarded as tuberculosis. The left upper zone is also suspicious.

Re-X-ray recommended."

The further 80 notified cases included 5 cases of non-pulmonary tuberculosis. Three of these occurred in the age group 1—5 years. Of the 80 cases, twenty died within a period of twelve months, giving a mortality rate of 25 per cent. Many of those notified were in an advanced stage of the disease, which helps to explain the high mortality in such a short period.

34 patients gave a definite family history of tuberculosis—an incidence of 42.5 per cent. As it is notoriously difficult to obtain an accurate family history in these cases, it may be presumed that the family had a tuberculosis history in at least a further 10 per cent. If we put the figure roughly at 50 per cent., it is evident that about half of the total cases were infected with the disease by their parents or relatives. This illustrates what has been repeatedly pointed out in these reports that any patient who is spitting and coughing up tubercle bacilli is a dangerous menace to those in contact with him (or her).

45 of these patients have been X-rayed by this department. Others have probably been X-rayed privately. It is the endeavour of this department to have **all cases** X-rayed, but some are unfortunately too ill to undergo this procedure, and others either refuse or find it too difficult to leave their homes and go a distance of 30—50 miles from a district perhaps ill-served by suitable transport. Where the patient is financially unable to arrange for transport, an ambulance is provided by the Board of Health free of charge. An endeavour is also made to have the sputum examined for tubercle bacilli. In the present series 16 out of 19 were found to be sputum-positive. These cases are usually of an advanced nature, as a positive sputum generally means that fairly extensive cavities or other diseased areas in the lungs are swarming with the organism, which breaks up the lung tissue and causes it to crumble and disintegrate. It is, of course, a truism that one or more negative reports on samples of sputum cannot be accepted as reliable evidence that the organism is not being spat up. Several **repeated** examinations must be performed before such evidence can be accepted. Furthermore quite a number of definite cases of the disease, as proved by X-ray examination, may have consistently negative sputa. The organism can only appear

in the spit when there is actual cavitation or breaking-down of infected lung tissue.

TUBERCULOSIS CASES NOTIFIED, 1940.

Total number of cases	...	80
Deaths,	...	20
Sputum-positive	...	16
Sputum-negative	...	3

		Pulmonary	Non-Pulmonary
Males	...	36	2
Females	...	39	3

Age	M.	F.	Pulmonary.	Non-Pulmonary.
1— 5	1	2	—	3
5—10	2	2	4	—
10—15	4	4	8	—
15—20	6	7	13	—
20—25	3	8	11	—
25—30	3	8	11	—
30—35	5	5	10	—
35—40	3	1	4	—
40—45	5	1	6	—
50—60	2	2	4	—
45—50	4	1	3	2
60—	—	1	1	—
TOTAL			75	5

The above table shows the sex incidence in the 80 notified cases at the different ages, together with some further relevant data. It will be noted that, in the age-group 20-30, the female notifications outnumber the male in the ratio of 16 to 6. This is a usual finding in most countries, and no really adequate explanation has so far been furnished for it, though there are many plausible theories.

60 of the notified cases occurred in persons up to 35 years of age, thus illustrating that this is a disease affecting people in the prime of life, with consequent enormous economic loss to the community.

Of the 75 pulmonary cases, the sputum was positive in 16 and negative in 3, out of a total of 19 specimens examined. A certain proportion of the remaining cases were private patients, and presumably their supta were likewise examined. One patient was notified a week after his death.

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TIONNSCNAMH i gCOIR LEIGHEAS NA hEITINNE.
(Scheme for the treatment of Tuberculosis).

DONEGAL COUNTY.

Return of number of patients treated under the County Tuberculosis Scheme during the year ended 31st December, 1940.

	Pulmonary Tuberculosis			Non-Pulmonary Tuberculosis			
	Children under 15 Years	Other Persons		Children under 15 years	Other Persons		Total
		Males	Females		Males	Females	
1. Insured Patients.							
(i) No remaining under treatment :—							
(a) On 1st January, 1940.	—	14	15	—	1	3	33
(b) On 31st December, 1940.	—	10	12	—	1	1	24
(ii) No. of new patients treated during year 1940.	—	—	7	—	—	—	7
(iii) No. of cases under observation at close of year 1940.	1	—	1	—	—	—	1
2. Other Patients.							
(i) No. remaining under treatment :—							
(a) On 1st January, 1940.	46	106	141	65	25	21	404
(b) On 31st December, 1940.	28	70	103	55	19	18	293
(ii) No. of new patients treated during year 1940.	3	26	30	4	4	3	70
(iii) No. of cases under observation at close of year 1940.	210	—	—	1	—	—	211

III. No. of patients who received treatment during the year in
(a) Institutions under the control of the Local Authority 145

(b) Extern Institutions 79
(See footnote).

Signed, M. S. BASTABAL,
Tuberculosis Officer.

Date 27th February, 1941.

This number, in addition to new patients, is to include patients

formerly dealt with under the Scheme who have returned during the year 1940 and are not already reckoned under (i) (a).

The sum of the figures in lines (i) (a) and (ii) should give the total number of patients of each class dealt with during the year.

Observation cases are not to be included in any of the figures relating to numbers of patients treated until a definite diagnosis of Tuberculosis shall have been made.

As to part III above :—

Note—If a patient was admitted more than once during the year to an Institution the case should be counted only once.

NOTE :—Patients treated in local as well as Extern institutions are given under the heading of "Extern" only. Patients treated in more than one extern hospital are counted once only.

Patients treated in more than one local hospital, or admitted twice to the same local hospital, are counted once only.

The accompanying table shows the admissions to and the discharges from the various local and extern institutions during the year :—

NAME OF INSTITUTION	Admissions	Discharges or Deaths	No. remaining on 31/12/'40
Donegal District Hospital ...	68	57	18
Glenties District Hospital ...	33	34	13
Carndonagh District Hospital ...	37	39	14
Letterkenny District Hospital ...	—	—	—
Lifford District Hospital ...	15	20	2
Cappagh Open-Air Hospital ...	7	9	3
Coole Open-Air Hospital ...	—	—	2
Peamount Sanatorium ...	14	30	14
Dr. Steevens' Hospital ...	17	20	3
Newcastle Sanatorium ...	1	—	1
Richmond Hospital ...	1	1	—
TOTAL ...	193	210	70

DOMICILIARY VISITS.

At the end of the year, there were thirty-two Jubilee and Dudley Nurses in the County, and they all visit the homes of the patients who are too ill to attend at the local clinics.

The total of visits paid by them during the year was divided as follows between the thirty-two districts :—

Annagry	...	302
Ardara	...	322
Arranmore	...	336
Ballybofey and Stranorlar	...	338
Ballyshannon	...	135
Bruckless	...	334
Buncrana	...	489
Bundoran	...	332
Carndonagh	...	146
Carrigart	...	164
Clonmany	...	191
Convoy	...	100
Derrybeg	...	160
Donegal	...	285
Doochary	...	481
Drumholm	...	415
Dunfanaghy	...	286
Dungloe No. 1	...	347
Fahan and Inch	...	181
Fanad No. 1	...	152
Fanad No. 2	...	157
Frosses	...	240
Glencolumbkille	...	236
Gortahork	...	269
Kilcar	...	192
Letterkenny	...	368
Lifford, Clonleigh and Castlefin	...	163
Malin	...	113
Moville	...	316
Muff and Upper Moville	...	170
Ramelton	...	117
Rathmullan		95

400 Domiciliary Visits were paid by the Superintendent Public Health Nurse in County Donegal to tuberculosis patients during the year.

TUBERCULOSIS IN RURAL AREAS.

(Some facts noted in an international survey).

In Eire, where nearly three-quarters of the population inhabit county areas, the tuberculosis rates are very much higher than in England or Scotland ; but in all three countries, the mortality is much less in rural areas than in towns.

High rates of tuberculosis mortality among young women have been detected in many countries.

The rate tends to increase in some districts owing to the fact that sick persons remain in their own homes instead of being isolated and treated in accordance with modern practice.

Rochat asserts that a decisive factor in the dissemination of tuberculosis is the infectious patient. Tuberculosis is, it is true, often a disease of the slums, but on condition that there are infectious cases in those slums.

After examining some 3,600 cases of tuberculosis among Polish peasants and the inhabitants of Lwow, Tomanek reached the following conclusions :—

(1) Rural tuberculosis assumed more serious forms than tuberculosis among the town-dwellers.

(2) Tuberculosis in both lungs was three times more prevalent among the peasants.

(3) "Old pulmonary tuberculosis" among old peasants was rarer than among town-dwellers of the same age.

(4) Tuberculosis of the skin and mucous membranes was more prevalent among the peasants, and tuberculosis laryngitis was much more prevalent (ratio 3.5.2).

(5) The very rapid progress of tuberculosis was especially frequent among the peasants.

(6) Rural tuberculosis was particularly marked by the tendency to produce distructive lesions.

(7) Glandular tuberculosis was more frequent among agriculturists than among the urban population.

(8) The actual constitution of the peasant appears to render him specially susceptible and vulnerable to tuberculosis infection.

The improvement of rural conditions has become a vital problem for the towns. A study by Olinescu Radu brings out the high percentage of country folk among the patients of a Bucharest dispensary. Out of 507 persons suffering from pulmonary tuberculosis, 61 per cent. came from rural districts, most of them having left their homes between the ages of 15 and 25. In 15 per cent. of the cases tuberculosis had already developed, and they had hoped to be cured in the towns. Their rural origin appeared to predispose them to bilateral progressive forms of the disease. In most cases, the onset of the disease occurred after ten years of residence ; in 31 per cent. of cases, it had first appeared from one to five years after their arrival in the Roumanian capital.

Sergent points out that the countryman who has become infected with tuberculosis is a menace to his birthplace. After a more or less lengthy stay in hospital, he returns to his native village, which is all the more dangerous because rural dwellings are often defective as regards hygiene and cleanliness, and in certain districts at any rate there is only one room for all the members of the family.

Human Tuberculosis due to the Bovine Bacillus.

The incidence of bovine tuberculosis in man is chiefly a rural problem. After studying the incidence and forms of tuberculous infections in man caused by the bovine bacillus, Lange asserts that there is no form of tuberculosis in which the bovine bacillus may not act as pathogenic agent ; in his view there are, broadly speaking, three categories of countries :—

(1) Countries in which the bovine type of bacillus plays no part or only a very small part in human tuberculosis, such as Japan, India, and to some extent Norway.

(2) Countries with an average proportion of bovine bacilli, at the head of which comes Germany, and possibly Switzerland.

(3) Countries in which the bovine bacillus plays an extraordinarily large part : England and Scotland. (He might have included Ireland in this category if he had had the relevant figures.)

The infection of cattle affects human health. According to Ruys, the possibility of human infection is greater in rural districts than in the towns, because the former consume more raw milk. The milk drunk by the country-folk often comes from a few cows only ; if one of them is tuberculous, the risk of contamination is particularly great.

Children are very liable to contract the disease since they are usually great consumers of milk, some of it from tuberculous cows. Statistics show that in England and Scotland, with only one exception—namely pulmonary tuberculosis—it is nearly always among children under five that the largest number of cases occur.

What are the various conditions that encourage the outbreak of a tuberculous lesion ? **Desroziers condemns the insanitary condition of cowsheds** and points out that : "Grooming, and choice and copious food are reserved exclusively for horses ; cattle receive what is left over. The food supply of milch cows is often inadequate because it is not based on their needs but approximately on the quantities of fodder available until the next harvest."

TUBERCULOSIS.

The following is taken from a phamphlet issued by The National Association for the Prevention of Tuberculosis :—

THE CONQUEST OF TUBERCULOSIS

(A Word for Everyone)

Under the popular name of Consumption, Tuberculosis is a disease which sends a shudder into the heart. Even those who read this phamphlet may have overcome a certain amount of reluctance. But if they will follow it through faithfully to the end, they may, perhaps, see the subject in another light. They may even resolve to join those who are trying to fight and conquer this evil. In a matter of this kind, the first step is to understand the problem we are facing.

Is Tuberculosis Hereditary ?

The idea that this disease is somehow passed from one generation to another in the blood is widely held, and is a survival of old-fashioned notions which should have died out in 1882 when the germ was discovered. Except in a few cases, which are so rare as to be museum curiosities, it is now known that no child is born with tuberculosis in its system. For practical purposes inherited tuberculosis does not exist. and it would be a good thing if this were more widely known.

The Seed.

Tuberculosis is caused by a growth in the body of a living germ which may be compared to a tiny seed, so minute as to be invisible except when magnified three or four hundred times under a microscope. Like other seeds, it requires a suitable soil in which to grow. In the absence of the right conditions it cannot multiply, but it will keep alive for a long time, even without moisture. Direct sunshine kills off the germ in a few hours. It is very important to understand that without infection with the germ Tuberculosis cannot arise. No germ, no disease.

Where, then, is this germ or seed of tuberculosis to be found ; how does it get into our bodies, and by what means can we avoid such an unwelcome visitor ? These are practical questions which require to be answered.

Let us take as a starting-point a person with Tuberculosis of the lung—the commonest form of the disease usually called phthisis or, more properly, pulmonary Tuberculosis.

A person with this form has in his lung vast numbers of these germs of Tuberculosis multiplying as quickly as the body will allow them. Some of them are being brought into the light of day in the spit. When coughing he may scatter countless numbers of them into the air. When he spits on the floor and stamps on the place with his foot, he leaves many of them behind. They are present on his handkerchief, on the edge of his cup, and indeed, on any article which comes into intimate contact with his spit.

We have seen that these germs of Tuberculosis will remain alive for a long time when they are not exposed to direct sunshine. They linger in the dust of that man's house, on the walls, on the floor. Unless he is careful, and knows of the danger, his towel and table utensils will be charged continually with fresh infectious material.

Such a person is a source of danger. That is why we see notices in post-offices and public buildings telling us not to spit. But Tuberculosis is not the only disease whose germs are distributed in this way. In like manner, measles, whooping-cough, and other infectious illnesses are spread by coughing.

It is obvious that the greatest danger from such a tuberculosis person, coughing and spitting out germs, will be run by his own family. They come into contact with him more intimately than those whom he may meet at his work or in the street. It is among them, particularly the children, that we must look for the beginning of Tuberculosis.

The Soil.

So much for the seeds and the way they are planted ; but we have to think of something else. In growing flowers in the garden, or corn in the field, we have to consider not only the seed, but also the soil.

Now the best soil for the growth of the germ of Tuberculosis is the system of a child, and it is of children that we must be thinking constantly in our efforts to eradicate it.

Let us return to the tuberculosis person who is the source of germs for those in his household. Let us suppose that he takes on his knee one of his little children. He kisses the child. It is easy to understand how the seeds of Tuberculosis will be passed from the father's lung to the child.

A little later, when the child grows up, it will begin to crawl about the floor in learning to walk. It is certain to get dust on its fingers and toys, and, with a child of that age, everything finds its way to the mouth. It swallows dust as it sucks at its tin soldiers and dolls. And this dust may contain the living germs of disease.

We have here taken as an illustration the father of the family as the source of infection. But it is not always so. It may be the mother, or it may be a nurse, or even a grandmother, who has tuberculosis of the lung and is spreading the germs through the household. Indeed, the danger to the child is greater when the family infection comes from the mother. This is easy to understand. The mother feeds and fondles her baby. Frequently she sleeps with her young children , and in washing and dressing them, and in cooking for the household, she may have opportunities of broadcasting the germs.

There are many households in which an old grandmother with a chronic cough lives under the same roof as young children. No one pays much attention to her cough, which perhaps has continued for years. A case of tuberculosis infection occurs in one of the children, and it turns out that the grandmother has a mild form of lung Tuberculosis and has thus been the source of the germ.

Another way in which children run the risk of infection with this germ is through the milk of tuberculosis cows. This danger and how to meet it are discussed in another leaflet of this series. (Leaflet No. 3).

The Harvest.

So far, we have described only the sowing of the seed of Tuberculosis. We have come nearer to understanding how this serious illness may begin to show itself in the body. First the seed, then the stalk, then the full corn in the ear, runs the Scripture. The sowing of the germs and the gradual unfolding of the disease are quite different things.

It must not be supposed that this seed comes to maturity at once, any more than a seed of corn in the earth. If we glance at the surface of a field some time after the corn has been sown, we shall not know it is there. The grain lies germinating in the soil, and for some weeks will give no hint of its existence. We know, further, that not every individual seed of corn will grow. Some of them may die. Others may find the soil so unsuitable that they may never come to the fullness of growth. Let us apply these notions to Tuberculosis.

In the natural course of things the human body has developed a very considerable power of being able to protect itself against the attacks of this and other germs. Clearly, if we had no means of defending ourselves, the human race would long ago have been swept away. In our blood, in the various glands and organs of the body, there are marvellous fluids which have the power to overcome the germs and render them harmless.

And so it comes to pass, for the most part, that the tubercle germs find the soil of the human body not a very suitable place in which to grow. In the majority of cases they are unable to establish themselves in sufficient numbers to cause disease.

It follows that not by any means every child who is exposed to these germs in the ways that have been mentioned develops Tuberculosis. Vast numbers of our fellow-citizens are going about fit and healthy because the forces of the body, or what is called the natural resistance, have been enough to overcome the germ. Of course there are times when this resistance is at a low ebb. When a child is cold or hungry or fatigued, there will be moments when its

power of fighting germs will be very small. But such temporary setbacks are soon overcome in health by the responsiveness of the system which rapidly recovers its natural tone. More serious trials occur with the ordinary childish infectious diseases such as measles, whooping-cough and influenza. These are the storm troops which may rob the citadel of protection against the heavy guns. Tuberculosis is always waiting in the background. We must learn not to ignore these complaints but treat them with caution on account of the more serious danger for which they may prepare the child's system.

The Road to Conquest.

From this account of the natural development of Tuberculosis two logical ways of prevention will be recognised. Thinking principally of young people, we must try first of all to remove them from contact with tuberculous persons in order that the seeds be not sown. Secondly, we must use every effort to increase the natural resistance of the body so that the seeds may find that soil unsuitable for their growth.

As regards the first point : it is not necessary to be unduly alarmist in our views. Tuberculous patients are dangerous only in so far as they will not take precautions. A person having a cough, whether from Tuberculosis or any other disease, should always cough into his handkerchief, and should spit into a bottle from which his sputum and the germs it contains may be removed and destroyed. It is necessary to remember that a chronic cough, even although it may be called by another name, may be Tuberculosis in disguise. In this case it is always perilous where children are concerned, and the wise parent will keep them away from any person who may be a source of contamination in this way. Constant exposure will mean danger in the end.

How the Germ Enters.

The germ, when taken in through the mouth, finds its way into the throat. The back of the throat is covered with minute glands which pour out a sticky mucus. This entangles foreign particles such as germs and forms the first line of defence that we possess against these undesirable visitors. But more important are the tonsils. These are two small glands lying in pouches, one each side of the back of the tongue. In structure they are something like sponges ; their duty is to guard the upper reaches of the breathing apparatus by catching germs and dealing with them. Connected with the tonsils and running down underneath the skin into the neck, and even into the interior of the chest, are tiny channels having a further chain of glands connected with them. If the tonsils are not able to keep back the invading organisms, they are passed on to these glands which are often very successful in dealing with them. In the healthy condition the glands of the neck are invisible and so small that they can hardly be felt underneath the skin. But

when they are actively engaged in defending the body against intruders they become swollen, and may be so large that we can see them, or feel them with the finger. That is the cause of those lumps in the neck we notice very often in other people, which are sometimes due to Tuberculosis of the glands.

The germs may then be carried to the lungs or swallowed and may reach any part of the body. How then does our system repel these invaders? In the blood there are chemical substances which we may compare to "poison gas" in their effect on the germs. Every single organ plays some part, and we are constantly learning fresh things about the delicate operations of this wonderful system which keeps us healthy.

How can we maintain the resistance of the body at its highest efficiency? There is only one way, and that is to help these organs to work properly. No medicine or form of treatment for the disease is of much real use unless it assists the organs to help themselves. Without the help of Nature we cannot cure Tuberculosis. The prevention of Tuberculosis and the cure of individual cases amount thus to much the same thing. Of course, prevention is undertaken usually in the homes of the people, while in cure we think of sanatoriums and hospitals. But in each case we try to give abundant air, sunshine, nourishing food, and protection from a source of living germs.

Let us think for a moment of these points.

Air.

Fresh air is so necessary, and we have been lectured about it for so long, that people often take it for granted as a mere professional claptrap used by doctors. But, in fact, abundant oxygen is the most important need of the growing child. We must remember that every organ of its body is expanding at a phenomenal rate. The child's system may be compared to a motor-car engine which is being driven at full speed all the time. Such a car will need extra supplies of petrol. Similarly, the child needs an even greater amount of oxygen than the adult.

There should be the fullest supply of moving air in every room, whether bedroom, office, shop, or any other place where people live and work. This means that the air must be moving to and fro. It will only do this if there are two openings or two sets of openings, and inlet and outlet respectively. The fireplace and window form the best combination. If there is no fire in the grate (as, for instance, in a bedroom), air will come down the chimney into the warm room. If there be a fire burning, it will take the air up the chimney with the smoke and the flames. If, at the same time, the window is open, even a small amount at the top, there is a perfect system of ventilation. One should make a habit of opening the window when-

ever one leaves the room. Infants, whenever possible, should be allowed to sleep outside in a perambulator .

During the Great War, soldiers in the trenches lived in mud and water for weeks and months. But because they were in the open air they remained healthy and rarely caught chills.

Sunshine.

Sunshine is the best killer of germs known to us. It has also a very beneficial effect on the skin, for that brownish colour which follows exposure to it seems to be the means of storing some of the benefit for our future use. In this country, unhappily, we do not see the bright sunshine as often as we should like, and in cities a thick curtain of smoke and dust often denies us what sunshine there is. This is why in hospitals special lamps for reproducing ultra-violet rays of the sun—or what is sometimes called "artificial sunlight"—are to be found. If used with care and by experts, they may have an excellent effect similar to that of the natural sun. In cases of pulmonary Tuberculosis, however, it is important to remember that direct sunlight on the skin may be actually harmful and hinder the progress of the cure.

Food.

Good feeding is of the greatest importance for children. Large numbers of them attending our schools are under-nourished. This is not because they are not given enough food, but because they do not get the right kind of food. Fruit and vegetables are just as necessary as meat and puddings. Porridge is falling into undeserved neglect. Too often children go to school, and in the country may walk a long distance, without a sufficient breakfast. The question of food is considered in detail in another leaflet of this series.

For mothers there is one golden rule. A child cannot have too much milk. Provided it is clean and free from germs, milk has more building and energy power than most other foods. Pure milk should not be thought of as a **drink.** It is a **meal** and a very good one. The best grade of milk to buy is "Tuberculin Tested" as this is pure and guaranteed free from the germs of tuberculosis.

Unless you can buy this grade, or milk which is Pasteurised, it is essential to scald all milk before giving it to children.

The Home.

A word about Housing and its relation to Tuberculosis. Ill-ventilated tenements, where a case of Tuberculosis is crowded with the family, give, of course, every opportunity for the germs to spread. But this is not the whole story. Bad housing conditions are not by any means the sole cause. It is a disease which is no respector of persons, and is found among rich and poor alike. If all the slums were swept away to-morrow there would still be a problem of Tuberculosis.

The fact is that people often find their way into a poor kind of dwelling because they have this disease. The loss of earning power which it entails for themselves and their families has gradually made them fall lower and lower in the economic scale. Tuberculosis is one of the causes of poverty at the present day.

We are spending in this country large sums—several millions a year, in curing and preventing Tuberculosis. This money would be better spent if more people understood the nature and causes of the disease. Light and education are badly needed.

The National Association for the Prevention of Tuberculosis hopes that you will pass on the knowledge of what you have read in this phamphlet to others, and so play your part in eradicating a terrible disease.

Control of Infectious Diseases.

The obvious method of prevention of the spread of infectious disease is to remove or destroy the cause. As we are unable to abolish disease-producing germs in the light of present knowledge, we are forced to adopt less perfect defensive measures. These consist of diminishing the prevalence of the germs as far as possible, and increasing resistance to disease. The following measures are usually adopted, and help to stem the tide of infectious disease :—

The obvious approach to the problem of preventing the spread of infectious diseases is to remove the cause. In the present state of our knowledge pathogenic bacteria cannot be abolished. Two avenues are therefore open to diminish as far as possible the prevalence of the organism, and to increase the herd resistance. The measures usually adopted combine both, and are enumerated below :

A. **To deal with patients and their immediate environment.**
   1. Notification of cases of the disease.
   2. Isolation of patients in hospital or at home.
   3. Disinfection—concurrent and terminal.
   4. Treatment of the patient in hospital or at home.

B. **To deal with contacts.**
   1. Quarantine of contacts.
   2. Observation of contacts.
   3. Exclusion of contacts from certain places, such as schools.
   4. School closure or dispersion.

C. **To investigate the source of the outbreak and if possible to remove it.**

D. **Preventitive measures applicable to the whole population.**
   1. Elimination of reservoirs of infection.
   2. General hygienic measures to prevent the transmission of

infection.

3. Protection of the susceptible population by immunisation.
4. Education and propaganda to keep the public informed and invite co-operation

Disinfection.

The following is a repetition of what was written under this heading in last year's report. Owing to its importance, it is felt that it may with advantage be reiterated :—

(See "Rural Health Practice" Mustard).

The following instructions are designed to be of practical benefit to householders nursing a case of infectious illness.

Household Directions in cases of communicable diseases.
Don't take chances !

A communicable disease is one that may be spread to others. In order to catch one of these diseases one must take into his body the germs from the sick or infected person. The germs are given off from the body in the nose and throat secretions or in discharges from the bowels or bladder. They are taken into the mouth or nose by soiled fingers, or into the stomach by swallowing contaminated food, milk or water.

With the occurrence of a communicable disease in your home, you have three responsibilities. (1) The care of the sick, (2) the prevention of the spread of the disease to other members of the family, and (3) the prevention of the spread of the disease to the public.

To prevent the spread of the disease the following things are necessary.

1. **Separate the sick from the healthy.** Put the patient in a separate room. If possible, choose a sunny, well ventilated room from which rugs and heavy curtains have been removed. Allow no one to enter the room except the person nursing the sick. It is best that the patient be the only one to sleep in the room. If necessary for person nursing to sleep in room, a separate cot should be occupied. Keep separate dishes for the sick, and wash them in the room. Burn or disinfect all food not eaten. The room should be screened.

2. **Disinfect or burn all discharges.** Discharges from the nose and mouth should be caught in old rag or paper napkins and burned. Bowel and bladder discharges should be disinfected with chloride of lime allowed to stand for at least one hour, and should then be buried in a trench prepared for this purpose. The amount of chloride of lime to be used should be twice the amount of material to be disinfected. Mix well.

3. **Disinfect the room every day.** We used to **think** that a bad-smelling fumigation on the last day of the disease would work magic. Like most "magic" it did not work and we have ceased to rely on fumigation. Now we **know** that the patient gives off poison each day, and that, in addition to disinfecting the discharges, the woodwork, the floor around the bed, the furniture, door knobs and everything touched by the person nursing should be wiped off every morning with a disinfectant solution. Do not forget that sunshine and fresh air coming through open windows are wonderful helps in disinfection. Send nothing to the laundry unless boiled or disinfected and only then with the Health Department's permission.

4. **The person nursing the sick.** It is highly dangerous for the person nursing to handle food for anyone else. She should not cook, milk or wait on the table. She should leave the sick room only if necessary, and then only after thoroughly scrubbing and disinfecting the hands. While in the sick-room an over-all apron should be worn. This should be removed when leaving the room.

5. **Other members of the family.** When the disease is diphtheria, typhoid fever, or smallpox, other members of the family should be given protective injections or vaccinated. They must keep away from the sick. If the sick room is not screened, have the men or the boys in the family do this. The men folk should immediately make the toilet sanitary.

6. **At the end of the quarantine.** Have a general house cleaning, with special attention to the patient's room. Use plenty of elbow grease, soap, water, sunshine, fresh air and disinfectant solution. Let mattress, quilts, etc., sun out-doors for two days. Boil other bed clothes. The patient and nurse should have a thorough bath. Wash the hair; give complete change of clothes. Sun and air or disinfect the clothes worn during quarantine.

7. **How to mix disinfectants. Chlorinated Lime:** Add 6 heaping tablespoonfuls to a gallon of water. Keep jug of this in sick room. Make fresh solutions every two or three days. **Use:** for discharge of bowels and kidneys. Cover material to be disinfected. Allow to stand for one hour, then bury. **Lysol** (or other disinfectant of similar strength): Add one (1) tablespoonful to a basin of water. Make as needed. **Use:** for disinfecting furniture, etc., and for hands after thorough washing. Hold hands down in the mixture for 2 minutes.

CANCER.

The incidence and death-rate from Cancer have been steadily rising for many years past, and this fact has given rise to a good deal of public uneasiness. On the superficial view the natural conclusion would be that the disease is actually occurring oftener than

before, but it is doubtful if this is the true explanation. Analysis of the figures shows that the increase is largely for cancer in situations where it is notoriously difficult to detect, the incidence in the commoner and easily-detected sites remaining at a fairly uniform level of recent years. It must also be borne in mind that the world's population is ageing, due to advances in public health and hygiene, and that there is thus an increasing number of people now alive who are within the cancerous age limits (40 years and over).

Nevertheless this disease is continually causing a large number of deaths which could be prevented by early treatment. Here, even more than in tuberculosis, the great problem is to persuade people to apply for treatment at an earlier stage of the malady. The fact that cancer in the early curable stage is painless is probably one of the main causes of this unfortunate delay in applying for treatment The public should realise that any lump or growth which persists for more than a month should be investigated. If the lump is increasing in size it is urgent that the doctor's opinion be sought without delay—even though the lump be quite painless, and causing no apparent inconvenience to the patient.

It should be realised that cancer is at first a **local disease.** A group of normal body-cells acquire malignant properties (through some cause at present unknown). These cells now begin to grow and multiply independently of the body-needs altogether, and eventually form an abnormal swelling or tumour. This tumour keeps on growing at a slow, steady rate (in most cases), and if unchecked, gradually spreads both locally and widely in all directions, and may even permeate all the body tissues in the final stages of the malady. It will be obvious, therefore, that the ideal treatment is removal of the tumour at the early stage, when it is purely a local growth. Whether this ideal can be achieved depends largely on the public. If they apply for medical advice at a sufficiently early stage, many lives can be saved.

As the cause of cancer has not so far been discovered, the scope of preventive treatment is somewhat limited. It is known, however, that prolonged and persistent irritation in any part of the body favours the production of cancer. It is a fact that the disuse of clay pipes for smoking has been a factor in the decreased occurrence of cancer of the lips and tongue. (The hot clay pipe is a cause of persistent irritation).

The British Government have been so concerned at the rising death-rate from cancer that they have introduced the Cancer Act, 1939, to help in the control of the disease. In the National Cancer Service, as defined in the Cancer Act, the Ministry of Health acts in a co-ordinating and supervising capacity. The actual work of administration and provision of facilities for diagnosis is vested in

the chief local authorities in England and Wales (county councils and county borough councils).

Each Council within a specified time, after consultation with the local medical profession, has to submit a scheme for the diagnosis and treatment of patients suffering or suspected to be suffering from cancer in its area for approval of the Minister of Health.

The arrangements made by local authorities will be directed towards two main objectives :—

(1) Increasing the amount of modern facilities for the diagnosis and treatment of cancer so that they may become available for the whole of the population, and

(2) inducing all patients to obtain advice and treatment earlier.

The Act provides for increased radium centres, and the setting up of consultative and diagnostic centres to which doctors can take or send their patients, or to which patients may go of their own accord.

The idea underlying the Act is the removal from practitioners and their patients of those difficulties which tend to prevent the latter from receiving the treatment best suited to their condition, and from receiving it at a stage of the disease when the opportunity of cure or amelioration is most favourable.

"The aim of the Act is to make modern facilities for the diagnosis and treatment of cancer available for the whole of the population. To prolong life, to assuage pain and suffering and to prevent unnecessary waste of human life are watchwords of the medical profession. Co-ordinated work in cancer, both in Great Britain and internationally, will help mankind further in the common struggle for national health." (Sir A. McNalty).

The chief bodies dealing with research in cancer in Great Britain are the Imperial Cancer Research Fund, the British Empire Cancer Campaign, and the Medical Research Council. Valuable work is also being done in the research laboratories of some of the larger voluntary hospitals. The Minister of Health has further set up a committee of experts on cancer as a sub-committee of his Medical Advisory Committee. This sub-committee includes representatives of medicine, surgery, pathology, radio-therapy, gynaecology, public health administration and general practice, with the Chief Medical Officer of the Ministry as its chairman. This Committee will advise the Minister on general principles and will be in a position to recommend any new hopeful measures of diagnosis and treatment in cancer to the attention of experts working under the national scheme.

In Scotland an advisory committee with similar aims has been appointed, which will be in touch with the English Committee.

THE BED BUG

In November 1940 I was informed by the Co. Surveyor that a County Council van was seriously infested with vermin. On personal inspection of the van I secured four dead and one live insect. They were specimens of the ordinary bed bug (Cimex lectularius). As far as I am aware infestation with the bed-bug has not so far been noticed in Co. Donegal and it was significatn that the history of the infested van showed that it was bought second-hand by the Co. Council after lying for some considerable time on the quay in Derry. I ascertained further that the van had previously been disinfested with sulphur some years previously though the matter had not been brought to my notice. It appears that the roller-man who first had the van swapped it some years ago, presumably because it was infested, without informing the person to whom it was transferred of the presence in it of the parasite. This was a stupid and very reprehensible proceeding, as it would have been much more sensible to notify the County Council and have the matter dealt with in a proper manner.

It was recommended that the van be burnt, and all the clothing disinfested in the steam steriliser in the County Home. A preliminary fumigation of the clothing with sulphur was recommended prior to its removal in order to kill off any insects on it at the time. The following was the concluding paragraph of my recommendation :

"It is most important that **nothing** be removed from the van, except for purposes of disinfestation. This applies to pictures, religious emblems, etc., which a man might be tempted to remove to his own dwelling without bothering to have them treated. The reason for this is that the bed-bug lays its eggs in all kinds of woodwork, crevices, backs of pictures, etc., and if articles of this sort are taken into a house the eggs will hatch out in a period of a few weeks, and the house will eventually be infested with bugs.

There are several reasons why the van should be destroyed :—

(1) It is very difficult to eradicate the bed-bug, even with the most up-to-date methods of disinfestation—methods which needless to say, we have not in County Donegal.

(2) It is very important that this pest should not be introduced into the County if it can possibly be avoided. In cities across the water, the fight against the bed-bug costs huge sums annually.

(3) The van was bought second-hand, has given several years' service, and presumably has served its purpose. It is of a type very difficult to disinfect properly, and I could not guarantee the eradication of the insect even with intensive treatment."

In another report I referred to facilities for disinfection (and

disinfestation) as follows :—

"Disinfection (and disinfestation) as practised at present by Sanitary Sub-Officers is very unsatisfactory, owing to lack of local facilities. It is the unanimous view of experts that a high-pressure steam disinfector is one of the best and safest methods of disinfecting material (clothing, bedding, etc.), from cases of infectious disease. In regard to disinfestation, I would refer the Board to a statement on page 25 of my annual Report, 1939 : "In delousing stations, garments are raised to a temperature (by means of hot air) of 60°C (140°F) for 10 minutes. This heat suffices to kill all lice and nits."

Furthermore, I wish to recommend that the Board purchase a portable sack disinfector, in addition, together with six foot-operated sprayers for disinfecting, as owing to the difficulty of transit from the more remote parts of the County, a portable sack disinfector would be of great benefit, especially in case of any further epidemic prevalence of infectious disease. The present practice of burning infectious clothing and other material, while effective from the point of view of hygiene, is apt to lend itself to abuse, and possibly to involve the Board in unwarranted expense."

There is no steam steriliser for infected clothing in any of the three Fever Hospitals in the county, and the Medical Officers of these institutions have informed me that the methods of disinfection in use by them are antiquated and of little value, apart from the rather expensive (if highly effective) practice of burning infected clothing, which has to be adopted as a precautionary measure in many instances.

In order to exterminate these pests and keep dwellings free from them it is essential to know the habits of the insect, and its stages of life from the egg to the adult or fully-grown stage.

Life History of the Common Bed Bug.

The following account is taken from a pamphlet issued by the Corporation of Glasgow, and contains all the relevant information for householders :—

The Insect.—The fully-grown adult bug is readily recognised as **a flat, mahogany brown, six-legged, wingless, blood-sucking insect of nocturnal habits.** When unfed, its body is as thin as paper, which permits the insect to retreat into the narrowest of chinks and shelter in woodwork, furniture, picture frames, and even the **joints of iron bedsteads**, and **it is in such retreats that the bug will be found.**

When fully grown, it is about a quarter of an inch in length and an eight of an inch in breath at the broadest part of its abdomen. It feeds entirely by inserting its sharp proboscis, usually into human

beings, and rapidly sucking up blood until it is full. The insect is fragile, and easily squashed. It emits a heavy odour because of a substance produced by special glands. This offensive odour, in addition to being disgusting to human beings, protects the bug from being preyed upon by its natural enemies. **The bug can live without food through long periods,** for several months in fact, and this feat of starvation accounts for its persistence in habitations, and also for the difficulty experienced in exterminating it. **Destructive measures may, therefore, have to be applied constantly as well as thoroughly.**

When mature, the female bug lays eggs which adhere by a thin cement to the material upon which they have been laid, such as wood, stone, metal, or any fabrics such as the edges of mattresses.

The Eggs. The eggs are elongated, ovoid, pearly-looking structures easily visible to the naked eye. They are about a twenty-fifth of an inch in length, and have an attractive appearance under a lens. During the summer months, and even at other periods of the year when the conditions are favourable, such as exist in dark, unventilated, stuffy apartments, the female is capable of laying a great many eggs, and its progeny may number over 200 in one season.

Normally the young bug emerges within ten days after the egg is laid, but this period may be very much prlonged in cold weather or by other unfavourable circumstances. **The egg may lie unhatched throughout the winter months,** and in this way tide the young insect over a very difficult period. **The egg case affords the contained embryo bug a very strong protection against noxious gases. It has been found that fumigants such as sulphur dioxide and hydrocyanic acid gas do not penterate the protective egg case. The young bug must be hatched out before it can be gassed** with certainty. If this point is remembered when fumigation is being carried out, a great many of the failures may be explained.

The Young Insect.—When the young bug emerges, it is no larger than a minute louse, very active, and able to look after itself. It is pale in colour, and may be readily overlooked. From the time of its birth, the young bug is capable of sucking blood, which it does very greedily. Its bite at this stage is practically painless, but a small red spot is usually left to indicate the site of puncture.

Moulting.—In the ordinary course of events, the growing insect will reach the adult stage in about two months, provided the conditions under which it is developing are favourable. Complete development, however, may be prolonged beyond a year under adverse conditions. Increase of growth is accompanied by periodic moultings. The skin is completely cast on five occasions at intervals of about ten days, and each cast forms an exact mould of the insect. **The moults can be found lying about wherever the bugs are developing, and are evidence of infestation.** After the fifth moulting matur-

ity is reached and the bug assumes its true mahogany-brown colour. At this stage, multiplication begins.

METHODS OF EXTERMINATION.

Prevention.—It is necessary to be on the look out for the first appearance of the bug and its eggs, and to deal with them at once. **It is therefore essential that those whose duty it is to supervise the accommodation of ships' crews should have a thoroughly practical knowledge of the bug and its habits. This cannot be over-emphasised.** The bug and its eggs will be found in the chinks of woodwork about bunks, the joints of iron supports, bed boards, wooden chests, furniture, picture frames, and corners not usually disturbed but providing an advantageous shelter from which to attack the sleeping victims.

Careful attention to the **cleanliness** of the sleeping quarters of the crew, particularly those of lascars, should in itself be **sufficient to prevent infestation.**.

The bugs may be introduced to the ship in the boxes or other personal belongings of the crew, and also in the crevices of boards or in other mattress supports which may be used in adding to the comfort of the sleeping bunks, **and these require special attention or should be prohibited.**

The mere spraying of the infested quarters with odorous disinfectants is usually futile, and might as well not be done. **Simple as it may appear, thorough cleansing of all structures with soap and water,** together with the scrupulous regulation of the **lighting** and **ventilation** of the crew's quarters, is the most effective procedure. Painting and varnishing of woodwork are also of great importance. By these procedures the eggs are easily dislodged and destroyed. Thus prevention consists of continuous cleanliness and frequent inspection for the presence of the bug.

Fumigation.—Where infestation has unfortunately occurred, **fumigation with sulphur dioxide is advised.** This may be applied by burning sulphur in metal pans, or by releasing the sulphur dioxide gas from cylinders of the liquified gas, precautions having been taken to seal all the exits from the compartment being fuimgated. The cylinders of liquified sulphur dioxide are known as "Sulphume;" and are recommended. Prior to releasing the gas, **the atmosphere of the compartment and all the woodwork, bunks, floors, etc., should be sprayed with water from a spray.** This need not necessarily contain a disinfectant. **The presence of moisture aids the fumes in dstroying bugs, fleas, lice, cockroaches, etc.**

The compartment which is being fumigated should be left sealed for several hours to allow the complete action of the gas just as is the case in fumigation to exterminate rats. **Hydrocyanic acid gas,**

although known to be effective, is not recommended because of the danger associated with its manipulation.

It is most important to note that where the bug has gained a firm foothold, one fumigation with sulphur dioxide gas will not complete the process of extermination. Some adult bugs will have escaped death owing to their having sheltered successfully in protective retreats ; **and the unhatched eggs will also have remained unharmed.** In the natural course of events, these eggs will hatch in about ten days ; **therefore fumigation must be repeated in two weeks to kill the newly hatched young insects. When the ship is at sea, it will well repay the shipmaster to have the fumigation of suspected quarters repeated periodically.** This will obviate the necessity for stripping woodwork from the crew's quarters, and also the expense of its renewal.

The following humorous verses were produced as a result of the bug episode by Mr. McGlynn, the versatile storekeeper in the County Home :—

EIRE'S INVASION BY THE GLASGOW BUGS.

Air : "Wearing of the Green."

In the year 1940 when Britain was at war
And the bombs rained down on Glasgow, sure the bugs did get a scare,
Their dug-outs and their shelters the Nazis skyward blew,
So they called a general meeting to decide on what to do.
They met in "Paddy's Market" and marched to George's Square
Where the senior bug from Govan was asked to take the chair.
Addressing the assembly which crawled around his feet,
" From this terrible man, A. H." says he, "we must now retreat."
A fat Jew bug from Gorbals said, " My friends, it's worth our while
To go and get our permits and sail for Erin's Isle."
They got their permits right enough, and early one fine day
To the tune of "' Tipperary," landed safe at Derry Quay.
In looking round for diggings, the Quay-side they did scan
And finally they settled in a County Council van.
This van was lately purchased, I should it here recall,
By the economic Council of the County Donegal.
Poor Charley was the keeper of this bug-infested van :
He resented the intrusion, as would any other man
Promptly he reported this to the County M. O. H.
Who told him he must burn it up without a day's delay.
'Have pity on me, Doctor, an unfortunate poor wretch :
No rest for me at night time- I constantly must scratch.
They swarm all around me, and on my pillow creep,
I'm nearly off my head from itch and want of sleep."

"I'll dose them," says the doctor, "and the bedding get it combed
And the whole thing disinfected at Stranorlar County Home."
But the Matron there objected and would not this allow,
She frankly told the doctor "I'll give my reason now."
"There was never clock or beetle, bug, or flea, or louse
That presumed to show his nose within the precincts of this house.
You can take them and cremate them, or anything you will ;
There is room enough at Barnes where those vermin you can kill."
One morning just at daybreak, a fire lit the sky,
'Twas in the Gap at Barnes those parasites did die.
And that is the full story as related unto me,
The end and ramifications of the Vermin Refugee."

SHOPS (CONDITIONS OF EMPLOYMENT) ACT, 1938.

The following recommendation was sent to the Board of Health in December, 1938 :—

Shops (Conditions of Employment) Act, 1938.

As you are aware, the above Act came into force on 16th May, 1938. I wish to draw the Board's attention to paragraph 59 of the Act, where it is laid down that : " **it shall be the duty of the sanitary authority** to enforce the provisions of part VI. of the Act, and to exercise the powers vested in them by the said part."

Part VI. of the Act refers to "Arrangements for Health and Comfort of Members of Staffs of Shops," and thus comes within the sphere of the Public Health Department.

As will be evident from paragraph 57, the Board are to appoint inspectors for the purposes of this part of the Act, but according to paragraph 57 (2) they may, with the Minister's approval, assign duties under the Act to any of their sanitary officers.

I recommend, therefore, that the sub-sanitary officers be assigned the duties of inspectors under part VI. of this Act.

These duties comprise regular inspection of shops in their district to ensure that :—

(1) In every part of a shop in which persons are employed by the proprietor of such shop to do shop work—

(a) suitable and sufficient means of ventilation shall be provided and suitable and sufficient ventilation shall be maintained :

(b) suitable and sufficient means shall be provided to maintain a reasonable temperature and a reasonable temperature shall be maintained.

(2) In every shop, not being a shop in respect of which an order made under sub-section (6) of this section is for the time being in force, there shall be provided and maintained suitable and sufficient sanitary conveniences available for the use of persons employed in or about the shop.

(3) In every part of a shop in which persons are employed to do shop work, suitable and sufficient means of lighting shall be provided, and every such part of such shop shall be kept suitably and sufficiently lighted.

(4) In every shop, not being a shop in respect of which an order made under sub-section (7) of this section is for the time being in force, there shall be provided and maintained suitable and sufficient washing facilities available for the use of persons employed in or about the shop.

(5) Where any persons doing shop work take any meals in a shop, there shall be provided suitable and sufficient facilities for taking those meals.

56.—(1) Where in any room in a shop female members of the staff are employed in the serving of customers, it shall be the duty of the proprietor of such shop to do the following things, that is to say :—

(a) to provide seats (in the proportion of not less than one to every three female members of the staff employed in such room) for such female members either behind the counter or in such other position as may be obtainable for the purpose ;

(b) to permit the female members of the staff so employed to make use of such seats whenever the use thereof does not interfere with their work ;

(c) to give notice in the prescribed manner and in the prescribed form of the provisions of paragraph (b) of this subsection.

It is to be noted that (Section 56 (2)) if the proprietor of a shop fails, neglects or refuses to comply with the obligations imposed on him by this section, such proprietor shall be guilty of an offence under this section and shall be liable on summary conviction thereof to a fine not exceeding, in the case of a first offence under this section, three pounds and, in the case of a second or any subsequent such offence a fine not exceeding five pounds.

In a previous communication I pointed out that I would prefer to have a County Sanitary Inspector appointed who would do all the necessary inspections, and who would also perform much useful

work in the supervision of disinfection, water supplies, sewerage and other sanitary work. The Board, however, seemed very reluctant to make such an appointment and they finally decided (in August, 1939) to assign the duties under the above Act to the sanitary sub-officers, giving them some extra remuneration for the work involved.

One report (Bundoran) only was received by this Department from any of the above officials as to their activities in connection with the Act during the year 1940.

HOUSING.

The following table shows for each county (urban and rural areas) and each county borough the number of new houses completed by local authorities private persons and public utility societies under the Housing Acts (1932-'40) to February 28th, 1941.

NEW HOUSES COMPLETED.

	Local Authorities		Private Persons & Public Utility Societies (Urban & Rural Areas).
	Urban Areas.	Rural Areas	
Carlow ...	294	723	101
Cavan ...	158	303	586
Clare ...	298	460	868
Cork (excluding Co. Boro') ...	769	1,438	2,441
Donegal ...	198	449	721
Dublin (excluding Co. Boro') ...	700	1,202	3,061
Galway ...	711	574	2,486
Kerry ...	589	170	2,587
Kildare ...	366	933	242
Kilkenny ...	377	802	162
Laoighis ...	187	548	181
Leitrim ...	—	191	461
Limerick (excluding Co. Boro') ...	52	1,230	861
Longford ...	70	385	144
Louth ...	1,486	553	534
Mayo ...	668	204	3,003
Meath ...	305	1,135	178
Monaghan ...	345	195	962
Offaly ...	439	748	313
Roscommon ...	58	382	1,046
Sligo ...	560	410	895
Tipperary (N.R.) ...	498	785	208
Tipperary (S.R.) ...	953	881	207
Waterford ...	229	588	170
Westmeath ...	476	451	286
Wexford ...	812	1,231	377
Wicklow ...	707	1,337	295
Co. Boroughs:			
Cork ...	1,627	—	532
Dublin ...	9,722	—	6,730
Limerick ...	942	—	387
Waterford ...	758	—	59
TOTALS ...	25,354	18,308	31,106

NUMBER OF PERSONS OF EACH RELIGION IN THE COUNTIES OF ULSTER (PART OF) :

County	Total Persons	Catholics	Episcopalians	Presbyterians	Methodists	Jews	Baptists	Others
Cavan	76,670	65,520	8,644	1,892	387	—	3	224
Donegal	142,310	118,906	11,516	10,445	1,042	14	8	379
Monaghan	61,298	49,715	5,206	5,872	209	3	25	259

HOUSING AND SANITATION.

HOUSING.

The number of cottages completed under the Labourers' Acts during the year 1940 was 26, and the number in course of erection at the end of the year was 32. On the 21st December, 1940, the Minister for Local Government and Public Health issued an Order under Seal confirming (with modifications) the Donegal County Health District Labourers' Acts Compulsory Purchase Order, 1937, for the acquisition of lands for the erection of a further 353 cottages.

HOUSING (Inspection of Districts) REGULATIONS, 1936.

No reports have been received under above Regulations during the year 1940.

ACHT NA dTITHE (Gaeltacht) 1929.

1. Iarrataisi a fritheadh,	3,874		
2. Meid Iarratas a ceaduiodh,	2,202		
3. Meid airgid a ceaduiodh,		£167.710	5 0
4. Meid airgid a h-iocadh,		£100,025	2 2

De 2 thuas ta 639 casanna nar chuaidh chun chinn leis an obair agus cuireadh as feidhm an t-airgead a ceaduiodh in a gcoir. Fagann san go bhfuil 1563 casanna ceaduithe agus £116,429 16s. 4d. curtha in airithe dhoibh.

Baineann an t-eolas seo thuas leis an treimhse o deineadh Acht na dTithe (Gaeltacht), 1929, do rith go dti 31adh Nodlag, 1940.

LETTERKENNY.

The Plans, Specifications and Estimates are with the Department for sanction in connection with a further Sewerage Scheme for the town, and when these works are completed the town will have a first-class Sewerage Scheme.

A site has been selected for the proposed Abattoir and the Urban District Council is, at the moment, awaiting sanction to same.

Tenders were invited for the scheme of ninety houses and the

tender of Messrs. J. W. Cunningham & Co., Carrick, County Donegal, was accepted at the sum of £45,108, and it is hoped that the scheme will now proceed immediately.

Amended plans have been submitted to the Department for an underground lavatory at the Market Square (for both sexes) and sanction to these documents is awaited.

All the stones have been broken in connection with the Relief Grant and good weather is now awaited, to have these rolled in.

Plans have also been prepared for the provision of new roads, so as to lay out the remaining portions of Housing Scheme for building purposes.

Two houses have been completed under the Small Dwellings' Acquisition Acts.

A new store has also been erected at the Market Square and is found to be very useful.

There is a new Bacon Factory in production at Port Road.

The above details were kindly supplied by Mr. C. McLaughlin, Town Surveyor and Consulting Engineer to the Board of Health.

BUNDORAN.

Sixty-two houses provided since introduction of Housing Acts. Four unfit houses rendered fit during year.

WATER-SUPPLIES.

Section 5 of the Rosses Regional Water Scheme was completed during the year, and a pipe line is now laid between Bunbeg and Derrybeg, complete with Fountains and Fire Hydrants. This Section proved to be one of the most populous in the Rosses Area, and in it a considerable number of Householders and business premises fully availed of the benefits of the water supply by having it installed in their premises.

The work on Section 4, from Annagry to Kincasslagh, was well advanced at the end of the year.

Consideration was given to the completion of the entire Regional Scheme by carrying a pipe line to Burtonport and Acres. Reports and estimates were submitted, but so far no approval has yet been given to undertaking this work.

The Lough Salt Water Scheme referred to in last year's report commenced in January, and progressed during the year, in spite of some difficulties. The works were held up for a time by a strike of labourers, but with goodwill on both sides and the valuable help

of representative people in the County a satisfactory agreement was reached, which has worked very well since. The Board, as promoters of this scheme, were fortunate in being able to secure some ten miles of steel mains under the War conditions of 1940, as the position in regard to deliveries of such goods has altered very seriously. Some difficulty was actually experienced in regard to obtaining small quantities of scour pipes, but suitable substitutes were found.

There are two important adjunct works in connection with this scheme, for which Reports, Plans and Estimates were submitted but so far no sanction has been obtained to proceed with them. These are the laying of a new service main from the Carnamuggagh Service Reservoir to the Letterkenny Urban Boundary and the laying of new mains in Kilmacrenan, where there is a totally inadequate supply and where the old mains permit of no fire protection.

In Donegal Town a much needed distribution pipe was laid, principally with the idea of giving water to Labourers' Cottages at the Mullans, which for many years had only an intermittent supply from an almost entirely encrusted pipe of very small diameter. The mains all through the town, with the exception of a small length renewed in recent years, are so badly encrusted that they require renewal.

Reports, preliminary Drawings and Estimates were submitted for the supply of a group of towns comprising Convoy, Raphoe, Castlefin and Killygordon, in a regional scheme. The estimated cost was considered by the Ministry to be too high, and the scheme has been dropped for the present. Alternative proposals, including Plans and Estimate were prepared for a separate supply for Convoy, and this project is under consideration.

Separate proposals for Castlefin and Raphoe were also considered.

The Narin and Portnoo Water Supply was dealt with by the Board and the Ministry, and there are prospects of its being undertaken in the near future, provided the necessary materials can be obtained.

Regarding the other proposed Water supplies, gaugings were taken in respect of Castlefin, Clonmany, Rossnakill, Dungloe, and in regard to Kilcar, Plans and Estimate were prepared and submitted.

SEWERS.

Plans and Specification were prepared and submitted for the town of Killybegs, and proposals made for the acquisition of the necessary lands and way-leaves.

In Ballyshannon, a scheme for a sewer to serve the Willybrook end of the town was prepared and a tender accepted for it in December, the work to commence early in 1941.

The details of the above waterworks and sewerage schemes were kindly supplied by Mr. W. J. Doherty, Consulting Engineer to the Board of Health.

SLAUGHTER OF ANIMALS ACT, 1935.

The principal points in this Act were summarised in the 1937 annual report. As stated therein, the object of the Act is to provide for the proper treatment of animals in slaughter-houses, the humane slaughter of such animals by approved instruments, and the licensing by the Sanitary Authority of the persons using such instruments.

The Board of Health have, likewise, power to make bye-laws for :—

(a) securing the decent and seemly conveyance of meat through public thoroughfares.

(b) the inspection of meat to be sold for public consumption, and

(c) prohibiting the sale for human consumption of meat which has not been inspected in accordance with such bye-laws.

This matter of bye-laws is in abeyance for the moment, pending the framing of model bye-laws by the central authority. The Act has been adopted, however, by the Donegal Board of Health and Public Assistance, and all slaughtermen have now to be licensed, and their premises are open to reasonable inspection.

It is hoped that the working of this Act will do much to improve the quality of meat prepared for human consumption.

An important provision of the Act is the following :

"No person, unless he is a registered veterinary surgeon or the holder of a slaughter licence for the time being in force, shall slaughter any animal in a slaughter-house." **(Penalty** £10 for a first offence).

It appears that during the period February 1939—February 1940 the Board of Health issued 40 licences. From February 1940—February 1941 only 26 licences were issued. I have had no explanation of this marked decline, apart from the suggestion that the other 14 licensees have given up their trade. The matter is being inquired into.

Name and Address of Licensee.	Year 1939-1940.
John Melly, Boyoughter, Doochary.	
John James McGettigan, Killybegs.	
Thomas A. Taitt, Bawan, Convoy.	
Dealty Boyle, Roshine, Acres, Burtonport.	
James Crumlish, Creatland, St. Johnston.	
John Crumlish, Slievebuck, Raphoe.	
Phil Boyle, Ardara.	
Hugh Sweeney, Drumatinney, Falcarragh,	
Michael McEleney, Glebe, Clonmany.	
John Harkin, Binnion, Clonmany,	
John McBride, Sleighan, Derrybeg,	
Thomas Stewart, Faughar, Ballymore,	
Charles Crumlish, Drumoghill, Manorcunningham,	
James King, Dunfanaghy,	
Peter McConigly, Kinnalough, Ballylar,	
Con McLoone, Glenties,	
Joseph L. Patterson, Ballyraine, Letterkenny,	
Thomas Boyle, Narin, Portnoo, Glenties,	
Dominick Gallagher, Magheraclogher, Derrybeg,	
Joseph Lafferty, Castlefin,	
Michael Cassidy, Main Street, Ballyshannon,	
Samuel Barrett, Ballyeriston, Glenties,	
John Kennedy, The Wood, Glenties,	
Andrew Gallagher, Ballinabreen, Ballindrait,	
John McBrearty, Bogagh, Carrick,	
John Joseph Hanlon, Quay Road, Dungloe,	
Edward Bradley, Drumhaggart Manorcunningham,	
Joseph Glackin, Newtowncunningham,	
Patrick Langan, Cloone, Cashelmore,	
Anne Duffy, Raphoe,	
Patrick Boyle, Keadue, Meenbanad,	
James Patton, Castlefin,	
James Harte, Corner House, Lifford.	
James McLoughlin, Muff,	
Joseph McClafferty, Carrigart,	
Charles Patton, Burnfoot,	
Charles Roarty, Meenanillar, Derrybeg,	
Andrew O'Donnell, Milltown, Burtonport,	
Phil Boyle, Croughboyle, Dungloe,	
Thomas Breslin, Deehill North, Ardara.	

Name and Address of Licensee. Year 1940-1941.
Thomas A. Taitt, Bawn, Convoy,
John Crumlish, Slievebuck, Raphoe.
Michael McEleney, Glebe, Clonmany,
Hugh Sweeney, Drumnatinney, Falcarragh,
John McBride, Sleighan, Derrybeg,
Thomas Stewart, Faugher, Ballymore,
Charles Crumlish, Drumoghill, Manorcunningham,
James King, Dunfanaghy,
Joseph L. Patterson, Ballyraine, Letterkenny,
Thomas Boyle, Narin, Portnoo, Glenties,
Dominick Gallagher, Magheraclogher, Derrybeg,
Michael Cassidy, Main Street, Ballyshannon,
John Kennedy, The Wood, Glenties,
Andrew Gallagher, Ballinabreen, Ballindrait,
John McBrearty, Bogagh, Carrick,
John Joseph Hanlon, Quay Road, Dungloe,
Edward Bradley, Drumhaggart, Manorcunningham,
Joseph Glackin, Newtowncunningham,
Anne Duffy, Raphoe,
John Gallagher, Belcruit, Kincasslagh,
James Patton, Castlefin,
James Harte, Corner House, Lifford,
Phil Boyle, Coeaghboyle, Dungloe,
John B. Harkin, Binion, Clonmany,
Daniel Devlin, Cleagh, Clonmany,

MEAT INSPECTION.

As regards meat inspection generally, there are five Veterinary Inspectors in the County who inspect carcases in slaughter-houses at intervals. They also attend at fairs and markets and seize any animals suffering from infectious or dangerous diseases.

The following are the five Veterinary Inspectors at present operating in County Donegal :—

Name of Veterinary Inspector	Address.
F. McShane	Donegal.
R. Marner	Carndonagh.
E. O'Hagan	Milford.
P. McGlinchey	Letterkenny.
T. A. McClintock	Dungloe.

The appended reports were kindly supplied by Veterinary Inspectors :—

Letterkenny,
11th March, 1941.

A Chara,

In reply to your request of work done last year. The inspection of slaughter-houses and meat was carried out at regular

intervals. The cleanliness of the slaughter-houses was maintained and during the meat inspection I had the carcases of six animals condemned and destroyed as unfit for human food owing to injuries, inflammation and decomposition.

The milk supply inspections were carried out and twenty samples were examined and found free from disease.

The inspection of Dairies and Cowsheds showed that these were kept up to a high standard of cleanliness and the examination of cows showed that five cows were stopped from supplying milk owing to disease of the udders (Mastitis). All the other cows were healthy and sound.

Yours faithfully,
T. A. McCLINTOCK, M.R.C.V.S.

Dr. M. S. Bastabal,
County Medical Officer of Health,
Stranorlar.

Summary of report received from Mr. F. McShane, Veterinary Inspector, Donegal.

Bovine Tuberculosis Inspector.

35 Visits of Inspection of Animals.
24 Animals Slaughtered.
2 Dead before arrival.
9 Animals found to be Non-Tuberculosis.

Milk and Dairies.

25 Samples of milk sent for analysis for Fat Content.

Swine Fever.

1 Report of Swine Fever investigated.

Sheep Scab.

1 Outbreak dealt with.

Inspection of Meat Stalls.

Monthly visits of inspection of meat stalls at Ballyshannon and Donegal were made.

MILK AND DAIRIES ACT, 1935.

A summary of some of the more important provisions of the Act were given in the 1937 Annual Report. Under Part IV of the Act, the under-mentioned Regulations were made :—

The Milk and Dairies (Special Designations) Regulations, 1938.
The Milk and Dairies (General Designations) Regulations, 1938.
The Milk and Dairies (Sale of Heated Milk) (Restriction) Regulations, 1938.

The Milk and Dairies (Special Designations) Regulations prescribe the Special Designation which may be used, namely : Highest Grade Milk, Standard Milk and Pasteurised Milk.

An explanatory memorandum (M.D.I.) was prepared by the Local Government Department and published, as well as a monograph on the establishment and maintenance of a tuberculin-tested herd (M.D.2.). The latter was issued for those intending to produce milk for sale under the Highest Grade designation. but it should prove useful to all farmers interested in the production of clean milk.

The following extract from the 1938-39 Report of the Local Government Department gives a useful summary of the regulations now in force :—

Highest Grade Milk must be produced from animals which are submitted to tuberculin tests and clinical examinations at intervals not greater than six months, and must be sold in bottles or in unventilated sealed containers. The milk must satisfy a prescribed methylene blue reduction test and must not contain coliform bacillus in one-hundredth of a cubic centimetre.

Standard Milk must be produced from cows which are clinically examined at intervals not greater than three months. The application of a tuberculin test is not prescribed but a bulk sample of the milk of the entire herd must be submitted at least once a year for biological examination for the presence of tubercle bacillus. The other conditions for this grade of milk are similar to those for Highest Grade Milk save that the reduction time required for the methylene blue test is lower.

Pasteurised Milk must have been heated to a temperature of between 145° and 150° F., held at this temperature for at least thirty minutes, and then cooled to a temperature not greater than 50° F. The milk must not contain more than 500,000 bacteria per cubic centimetre before pasteurisation and not more than 100,000 bacteria per cubic centimetre after pasteurisation.

A licence is required in respect of the use of a Special Designation, in connection with the sale of milk for human consumption, and the Regulations make provision for the grant of the following licences :—

Producer's Licence, Pasteuriser's Licence, Milk Bottler's Licence, Dealer's Licence.

The first three of these licences are obtainable from the Minister for Local Government and Public Health while Dealer's Licences are obtainable form Local Sanitary Authorities. The conditions precedent to and subject to which Special Designation

Licences are granted and the fees payable are prescribed in the Regulations. The use of a Special Designation by unlicensed persons is prohibited by the Act.

The Milk and Dairies (General Designations) Regulations prescribe the General Designations which may be used and these are milk, new milk, and fresh milk. No licence is required in respect of the use of a General Designation in connection with the sale of milk for human consumption.

Under Section 32 of the Act regulations were also made entitled the Milk and Dairies (Sale of Heated Milk) (Restriction) Regulations The effect of these Regulations is to prohibit the sale of any milk which has been heated to a temperature higher than 100° F. unless such milk is being sold as pasteurised milk in accordance with a licence to sell pasteurised milk granted under the Special Designations Regulations. The only exemption allowed is in respect of heated milk sold for consumption as hot milk, e.g. in restaurants, cafes, etc.

The above Regulations apply only to the sale of whole milk intended for human consumption in the form of milk and do not affect the sale of skimmed or separated milk, cream or buttermilk.

The 1st January, 1939, was the date originally fixed for the coming into operation of Part IV and Sections 32 and 33 of the Act and of the above Regulations, but representations were made to the Department as to the difficulty which a number of applicants for licences would experience in complying before that date with the necessary requirements, especially where the purchase of new pasteurising plant was involved. On consideration of this and other circumstances it was decided to postpone the date of commencement to the 1st April, 1939.

Representations were also received during the year by the Local Government Department regarding the standard of milk-fat laid down under the Milk and Dairies (Special Designations) Regulation 1938, for samples of Highest Grade Milk and Standard Milk. After consideration of these representations it was decided to modify the standard ; and accordingly amending regulations entitled the Milk and Dairies (Special Designations) Regulations, 1939, were made in which it is prescribed that every sample of Highest Grade Milk and Standard Milk shall contain not less than 3.1 per cent. of milk-fat and that the average milk-fat content of all samples taken over any continuous period of six months must not be less than 3.25 per cent.

Before the end of the year 90 applications for licences had been received by the Local Government Department ; of these applications 41 were in respect of Highest Grade Milk, 28 in respect of Standard Milk, and 21 in respect of Pasteurised Milk ; approximately 30 applications were withdrawn.

MILK AND DAIRIES ACT, 1935.

The following table shows the details of applications made and applications granted, up to 31st December, 1940, for the County Health District :—

District.	Veterinary Officer.	No. of Applications.	No. granted and Registered.
Donegal	F. McShane	67	27
Buncrana,	R. Marner	79	29
Milford,	E. O'Hagan	25	5
Letterkenny,	P. McGlinchey	106	38
Glenties,	T. A. McClintock	133	76
TOTAL		410	175

With regard to the Urban Districts of Letterkenny, Buncrana, and Bundoran, the following Table shows the state of affairs at December 31st. 1940.

Urban District	No. of Applications.	Number Granted	Number Refused
Letterkenny	35	13	18
Buncrana	9	8	—
Bundoran	28	12	—
TOTAL	72	33	18

FREE MILK SUPPLY SCHEME.

A sum of £2551 7s. 7d. was paid by the Board of Health for milk supplied under the Scheme during the year 1940. (This sum includes the cost of Full Cream Milk Powder). The amount paid during the year for Administration costs was £196 6s. 2d. The number of children in receipt of milk (either in liquid or powder form) on the last day of the year was 1,360 and the daily number of pints of milk being supplied was 1,003 During the year difficulty was experienced in obtaining milk from registered contractors at a price which would be approved by the Minister for Local Government and Public Health. The prices paid for milk ranged from 1/- to 1/6 per gallon. Milk powder was supplied in cases where natural milk could not be procured.

"The figures given above are approximate. They are (in money) the actual amounts paid during the year, but do not neces-

sairly represent the actual cost of the goods supplied during the year. However, they may be taken as being so near the actual figures as not to make any material difference for the purposes of the report" (Secretary, Board of Health).

Bundoran.

Operated from 1st April 1939 to 31st March 1940. Six children per day supplied. 183 gallons delivered at homes, Committee : Messrs. J. Murphy, J. Spratt, T Meehan.

FOOD AND NUTRITION.

The following talk was given at the request of the Ballybofey St. Vincent de Paul Society in conjunction with the local Parish Council. As the subject-matter is very important in the present crisis, it is deemed advisable to include it in this report.

27/1/'41.

REAMH-FHOCAL ("Food and the Housewife").

A Chathaoirligh agus a Cháirde,

Ta athas Clanna Gaedheal a fheiscint annso anocht ag cur spéise 'san mbiadh. Cuirm i gcuimhne dhibh an sean-fhocal ud ata le faghail i litridheacht na nGaedheal : "Nuadh gacha bidh agus sean gacha dighe." Ni thig liom cur sios ar an dara cuid de'n radh sin os rud neach bhfuil aon taithighe ro-mhór agam ar an ôlachán, acht is féidir dom a radh go bhfuil corp lár na firinne 'san chéad chuid—agus do dheallrochadh sin go bhfuil an chreideamhaint chéadna ag dul do'n da chuid le chéile. Mar sin do, is fios dúinn nach raibh na sean-Ghaedhil dall ar chúrsaí bidh, agus ba mhór an náire dhuinne da leigimis tharainn pe beagán cólais ata bailighthe ag Saoithe bidh na linne seo. Go mba stór agus taca dhuinn an t-eólas sin i n-am an Ghábhaitair ! Deirtear go bhfuil an t-am san ag druidheamhaint ar sodar linn i lathair na h-haire—i bhfad uainn an t-olc.

Ni foláir dom iompódh ar an mBéarla anois is dócha ar eagla na tuigfidhe go ró-mhaith mo chuid cainnte. Nára fada leis go mbeidh a mhalairt de sgéal amhlaidh.

27/1/'41.
PUBLIC HEALTH DEPARTMENT,
STRANORLAR.

FOOD AND THE HOUSEWIFE.

Mr. Chairman, Ladies and Gentlemen,

I must thank you for your kind invitation to me to come here and address you on some special aspects of the food problem. It is, as you know, a burning question at the moment, and I am glad to have the opportunity of giving you a talk on what I hope will be fairly practical lines There is an Irish proverb which says : "Is olc an ghaoth nach séideann do dhuine éicint", and it is apposite in the present connection, since I am hereby afforded an opportunity of doing some propaganda in a very important realm of public health, namely food and dietetics.

Some people are apt to scoff when we begin to insist on talking about dietetics or the science of proper feeding. They become particularly scornful when they are told perhaps that certain objects of food which they had always regarded with contempt are now said to be of high nutritive value. Just recently for instance I met an intelligent man who said to me : "I always thought carrots were fed only to animals, but I hear a great deal of talk about them now as human food. What virtue is supposed to be in them ? ". I said "they contain a large amount of vitamin-A, the protective substance that helps us to grow and to see well in the dark". "Nonsense", he said, "they are only food for donkeys." Well the donkey's traditional liking for carrots has only confirmed my secret conviction that this useful animal has been given an entirely undeserved reputation for stupidity. Anybody who drives a motor-car will tell you that donkeys, ducks and goats are the gentlemen of the road. They always know where they are going and more important still, they invariably go there. So I take off my hat to the donkey with his unerring road-sense, and his perspicacity in picking as his favourite vegetable a food like the carrot which modern science has shown to be such an important factor in our diet. This digression is perhaps slightly irrelevant, but it is important as illustrating the viewpoint of the "man in the street". If somebody asks me why were we not told about these things in our young days, I can only reply that many important discoveries in the realm of dietetics have been made within comparatively recent years, and were not known to our forefathers, though some of them were suspected to be true

Before actually starting on our subject proper, I wish to state very briefly some fundamental scientific principles. I have been warned to keep this talk strictly non-technical, and I shall endeavour to do so in the main, but my conscience would be uneasy if I did not at least mention some of the fundamentals, and if anybody is not interested in them, I promise not to bore you for very long.

Eating is such a part of our daily routine that I am sure there are millions of people who never stop to ask themselves : "Why do we eat ?" Some would probably answer : "Because we feel hungry", but would be at a loss to know **why** we feel hungry The answer is that the human body is, as it were, a machine which requires fuel to keep it going, just as a motor-car will not go without petrol or some substitute. Food is the fuel which makes the human body capable of existing, but in the human body our food has to subserve certain special purposes which are not required in man-made machines. It has to provide energy and warmth, helps to re-build our tissues which are continually being renewed, to form the tissues of growing children, and to provide us with vitamins or protective substances. When foods are broken-down or analysed by chemists they are found to consist of varying amounts of what may be termed proximate constituents. These are proteins, fats, carbohydrates, water, minerals and vitamins or protective substances—the bricks and mortar of our food. It may seem somewhat surprising that a homogeneous-looking food such as bread should contain a mixture of some or all of the above substances, but it is, nevertheless, a fact that can be grasped fairly easily by most people. After all if you look at a finished stone wall, although it looks so smooth and all of one piece, you can visualise for yourself that bricks and stone and mortar and cement and perhaps other things are all contained in it. So that the presence in foods of the chemical substances mentioned, namely : proteins, fats, carbohydrates, minerals, water and vitamins should not be a difficult matter to grasp, especially for those who are interested in this aspect of the question. Nevertheless it comes as a surprise to most people that two-thirds of the volume of a good loaf of bread is made up of gas, and of the solid part about 40 to 50 per cent. by weight consists of water, so that bread is one of the least watery of vegetable foods. Indeed it contains relatively less water than raw meat. (The remaining one-third of the loaf contains : water 40 per cent, carbohydrate 51 per cent., protein 7 per cent., fat 1 per cent., minerals 1 per cent.). Again, speaking generally it may be said that green vegetables contain a great deal of water (80% - 90%), almost no protein or fat, and only a small quantity of carbohydrates (2 to 8 per cent.). Their framework contains a great deal of cellulose (which is indigestible), but the amount of minerals and protective substances (vitamins A, B, C) which they contain is relatively large, and this it is which confers in them their supreme value as food for man and animals.

One is particularly struck with the large amount of water in the make-up of so many foods, and it certainly serves to bring home to us the importance of water in the human body. I need not elaborate on this point, as most of us have experienced to some degree at least, the unpleasant effects resulting from lack of it. J. H. Lawrence in "The Seven Pillars of Wisdom" gives us the following vivid description of the terrible effects of thirst :

. . . . . "He must have lost himself in the sand haze and wandered till his camel broke down ; and there died of thirst and heat. Not a long death—even for the very strongest a second day in summer was all—but very painful ; **for thirst was an active malady** ; a fear and panic which tore at the brain and reduced the bravest man to a stumbling, babbling maniac in an hour or two ; and then the sun killed him."

One other technical point just requires mention. The energy-value of a food is, naturally, in view of what I have said as to the function of food, a most important matter. Every time we walk, talk or do any act involving movement, we use up energy, which is derived from our food. Now to render the values of foods comparable, their energy-value is estimated as so many Calories or heat-units. This is convenient, as we must have a common standard to measure the foods by—just as we adopt the standard of lbs. and ozs. for measuring weight. The energy-value of most food-stuffs has been accurately calculated by chemists, so that we can tell by referring to certain books and tables, how foods may vary as to their energy-giving qualities. For instance we will find that 1 lb. of butter gives 3,497 Calories while 1 lb. of white bread gives 1,182 Calories. Even if we are not interested in Calories as such, we can gain a useful idea of the energy-value of different foodstuffs by consulting such tables.

However, the average housewife does not really need to bother about proteins, fats, carbohydrates etc. from the practical viewpoint. She is usually quite willing to accept that scientists have proved these things to their own satisfaction, provided they tell her in plain language how to feed herself and her family economically and well. Nevertheless we must not adopt too sceptical an attitude to scientific facts. The more knowledge of nutrition is spread among the working people, the healthier will our population be. Every fresh inquiry into the nutritional state of a population shows that, with the same amount of money, some housewives are able to provide a much more nutritious diet than others. Indeed, in all sections of the community, education in the principles of nutrition—with special adaptations to individual circumstances—we would do much to raise the level of nutrition. It is an unfortunate fact that where the wages are inadequate and the family large, there is particular danger of nutritional deficiencies. This is all the more disturbing as we are aware of the paticularly ill effects of malnutrition on the young. The reassuring doctrine that "with every mouth is born a pair of hands," is cold comfort for parents with a large family of small children whose mouths must be fed, but whose hands are still incapable of contributing towards the feeding process. The danger of malnutrition seems particularly serious in such cases. To illustrate the rather casual viewpoint of some individuals on this question I am tempted to recall a story I heard recently. A young man who had been unemployed

for many months, went to the P.P. and said he was going to get married. "But tell me, John", said His Reverence, "What are you going to live on—who is going to keep you?" "Ah, well, Father", said the embarrassed but decidedly optimistic applicant for matrimony, "the children will always be coming along". I am afraid that many of us display an equally haphazard attitude of mind when we set about providing ourselves with food.

The housewife buys her food at some six different shops. From the baker and confectioner she buys her bread, cakes, rolls and pastry. From the butcher she gets meat, sausages, offal and possibly game and poultry ; from the dairyman butter, eggs, milk, cream, cheese ; from the fishmonger the different varieties of lean, fat and shell-fish ; from the greengrocer fruit and vegetables ; and from the grocer tea, sugar, flour, biscuits, lard, margarine, dried fruit, bacon, jam, syrup, etc. In many smaller towns and villages, of course, we have not this subdivision of commodities, and the local grocer supplies all those goods which are not easily perishable, so that we may obtain from him condensed milk, bacon, cheese, etc. in convenient-sized cartons, while the perishable foods are looked after by their own specialists.

The easily kept foods are, as a rule those from which we derive **energy and warmth** in large amounts and little else. Owing to the fact that they keep well and are relatively inexpensive, they are apt to be consumed in increasing amounts in war time **to the exclusion of other very necessary but more expensive foods.** Thus a state of war is apt to unbalance our diet, and leads us to consume too much of the energy and warmth producing foods and too little of those which build up the body and of those which protect it from disease.

The **body-building foods**, milk, cheese, meat, fish and eggs, are made of the same fundamental stuffs as the body itself. Some other foods, of course, such as bread, pulses etc. also contain some body-building substances, but these two foods are not as good as the first-named ones. The body-building foods are of prime importance in the growing body of the child, but are also necessary in grown-ups to replace the constant wear and tear of tissues worn-out or damaged in the stress of living. The energy foods will not do this efficiently. The body-building foods are the only ones really of use in body-building.

The **protective foods** are those which contain the vitamins and the mineral substances (e.g. Ca, Phosphorus, Iron, Iodine, Potassium, Sodium, Magnesium). I am convinced that country people are quicker to appreciate the necessity for minerals since they constantly have to keep adding them to the soil to produce healthy crops, and further they add lime (or calcium) to the food of poultry in order to ensure properly-formed egg-shells. Calcium or lime is also a most important constituent of human food, especially in infancy and youth. It enters largely, of course, into the structure of bones and teeth, which may be reckoned among

our most cherished bodily organs. The vitamins or protective substances protect the body against sickness and disease in a very special way. They protect against rickets, scurvy, night-blindness, against particular skin and nervous diseases, and protect the lining membrances of the mouth, nose and throat against invasion by microbes. This twentieth century of ours should be proud of its discovery of these very important protective substances. They are contained in foods which we obtain mainly from the dairyman, the fishmonger, and the greengrocer.

We may now group the different foods according to what they do in the body.

BUILD ON THESE.

The foods bought by the housewife according to what they do in the body may be grouped according to the following chart. It is important to remember that each person needs something from each group every day.

Group 1.

BODY-BUILDING FOODS.

"They build up the tissues of the body and prevent wear and tear."

X MILK
X CHEESE
X EGGS
X MEAT
X OFFAL
X SAUSAGES
X POULTRY
X GAME

Many vegetable foods such as potatoes, beans, peas etc. also help to build up the body, but they are not such good body-builders as the above.

Group 2.
PROTECTIVE FOODS.

They help to protect us against disease. **ALL THREE CLASSES MUST BE REPRESENTED IN THE DIET.**

CLASS I.

X THE DAIRY FOODS ; milk, cheese, eggs, butter, cream, vitaminised margarine.

CLASS II.

X WHOLEMEAL BREAD
X GREENGROCERIES, (Green vegetables. carrots, tomatoes, fruits—fresh or tinned).

CLASS III.

X THE FAT FISH, (e.g. herring, kipper, salmon—tinned or fresh).
X LIVER.

The protective foods are those which contain the substances to build up teeth and bones and are necessary for proper nourishment. They protect the body against sickness in a very special way.

Group 3.

THE WARMTH AND ENERGY-PROVIDING FOODS.

"They provide fuel for the human body."

X BREAD
X CAKE, PASTRY, SCONES, etc.
X SUGAR, JAM, SYRUP, TREACLE, HONEY
X FLOUR, BISCUITS, RICE, TAPIOCA, SAGO
X DRIED FRUIT AND PULSES
X LARD, DRIPPING, SUET
X MARGARINE
X BACON, HAM.

The warmth and energy-producing foods are good for little besides warmth and energy and they should not, and cannot, be used to replace the body-building foods or the protective foods.

PROTECTIVE FOODS.

In a recent lecture Sir John Boyd Orr, M.D., says :

"In planning for a perfect diet we should depend not so much on attempts to provide a sufficient amount of any specific nutrient as on **ensuring that the intake of the protective foods is ample.** We do not yet know all the dietary constituents which are essential for health, but **we do know that a sufficiency of the protective foods will supply everything which the body needs.** Fortunately everything can be supplied by a few foods e.g., **milk, green vegetables, wholemeal bread and potatoes.** These taken together in sufficient quantity would meet all bodily needs for specific constituents.

This is of importance at the present time when the supply of some of our foods, such as eggs and imported fruits will be redueed. The country can produce enough milk, vegetables and potatoes to meet the needs of the whole population, and there is no unsurmountable difficulty in making wholemeal bread available (90 per cent. wholemeal bread is now compulsory in Eire !). The change over to increased consumption of these protective foods will involve an alteration in dietary habits. **The chief change needed for health is to bring the consumption of milk and vegetables among the poor up to what it is among the well-to-do."**

B. M. J. 18/1/'41.

It is obvious therefore that Groups **I, II** and **III** cannot replace each other in the diet, except where they overlap, and if the intake of any one group is cut down owing to war scarcity our diet is apt to be lacking in certain **essential** substances, and therefore the health of the nation is endangered.

In the above table it will be noted that Group **II** has been divided into classes, whereas Group **III** has not. This is because each food mentioned in Group **III** can replace any of the others. Thus bread can replace sugar, jam, rice, tapioca, etc. But in Group **II** the dairy foods cannot take the place of the greengroceries or of the fat fish. All three classes of Group **II** must be included in the diet. Thus the practical housewife, instead of trying to memorise facts about proteins, carbohydrates, calories, etc., has only to know the three groups of foods and what they are used for, and the three classes in Group **II** — that is six things altogether.

Owing to the extreme importance of the protective foods (which contain the essential vitamins), it may be well to consider them in a little detail. If we take **greengroceries** for example we note from the table that they comprise green vegetables, carrots, tomatoes and fruits — fresh or tinned. It is necessary, however, to point out that the vegetables and fruits differ considerably in their content of vitamin (or protective substances), and minerals. Indeed it would be possible to pick out a mixture of fruits and vegetables containing little or none of the substances for which we are specifically bidden to eat them. Thus by choosing pears, apples, plums, cherries, and grapes among the fruits, and lettuce, carrots, celery among the salads and vegetables, a man could practically steer clear of calcuim, iron and the anti scurvy vitamin. So it is advisable to indicate the fruits and vegetables containing satisfactory amounts of these protective substances, in order that the housewife with restricted choice may order her foodstuffs to the best advantage. First it is as well to realise that the prevalent idea that vitamins are destroyed by cooking is false. Vitamins are chemical substances, even if present in food in only minute amounts. Most of them have now been manufactred by chemical means or isolated from food. As Professor Mottram says : Cooking does not kill them because they were never alive". Two of them, however, are apt to suffer by excessive heat and oxidation, so that cooking may destroy these to some extent. This destruction has, however, been exaggerated, and the only one that really is in danger of destruction in this manner is Vitamin-C (present in fresh fruit). Furthermore when we boil potatoes or greens or turnips some of the vitamin-C passes out into the water, and some is also destroyed. When therefore we throw away the water from the greens, we throw away half the original amount of Vitamin-C in them. There is further destruction of this vitamin if fruits or vegetables are kept hot for a long time or re-heated. For this reason, it is well not to rely for one's supply of this vitamin on vegetables supplied in restaurants or canteens.

For the benefit of those wishing to make a wise selection, the following is a list of fruits and vegetables containing large amounts of Vitamin-C, followed by a list of those with little or none.

Table 1.

Fruits and Vegetables with Large Amounts of Vitamin-C.

Home-grown fruits :	Blackcurrants, Strawberries, red and white currants, loganberries and gooseberries.
Foreign fruits :	Oranges, lemons, grapefruit and bananas.
Home-grown Salads :	Watercress, tomatoes, radishes, mustard and cress.
Home-grown Vegetables :	Sprouts, cabbage, swede turnip, spinach, white turnip, potatoes

Note : These are arranged in approximate order of value in supplying Vitamin-C. Blackcurrants and sprouts have the most ; cooked vegetables may be considered to have lost half their Vitamin-C content, but it is worth noting that sprouts, cabbage and turnips can be used raw as salads. (Mottram).

TABLE II

Fruits and Vegetables with little or No Vitamin-C.

Apples (except Bramley seedling).	Bean (runner).
Cherries.	Carrots.
Grapes.	Lettuce.
Pears.	Onions (except the leek).
Plumbs.	Parsnips.

As Professor Mottram insists, it is evident that the housewife has to exert a certain amount of care in choosing her fruits and vegetables in the second class of Group II., that is the protective foods. The difficulty however can be solved in other ways. For instance by the daily service of half a grapefruit or an orange or the juice of these, or even the tomato cocktail, which is quite popular in some homes nowadays, though if it comes from a can or bottle complete reliance should not be placed on it. A third method is by serving a raw salad every day, choosing the salads and vegetables listed in table 1 above. In summer time raw or stewed fruits chosen from this table will suffice. Where extreme economy has to be practised raw salads of sprouts, cabbage or swede turnip may be taken. Nowadays, or at least

when foreign fruits were more cheap and plentiful, most people ensured that they were getting enough Vitamin-C by the routine of taking orange or grapefruit juice daily Some people are apt to regard this daily ration of orange juice at breakfast time as just a modern fad, but I can assure them that it is based on very sound dietetics. It supplies the anti-scurvy vitamin, which is apt to be lacking in many modern diets, but indeed, the best modern diet is a great improvement, in many ways, on that of former days. If we look up the historical records, we will find that when the potato crop failed in 1847 in this Country, there were several serious outbreaks of scurvy among our people. The potato was evidently the sole protection of our poorer people in earlier days against this disabling disease. It is rarely found in these countries nowadays, though most of you will be familiar with the ravages wrought by it in the British Navy in the 18th century for lack of fresh fruit and vegetables.

For centuries Scurvy was one of the commonest diseases in Europe, and particularly so in northern latitudes, where the diet was apt to be monotonous and lacking in fresh fruit and vegetables. After the discovery of America, when long sea voyages become so popular, Scurvy exacted a terrible toll of seamen. Admiral Sir Thomas Pasley gives a good picture of the ravages of the disease in the middle of the eighteenth century in England. With half the crew of his 28-gun frigate "Sybil" down with the malady he wrote despairingly "Of all disorders this at sea is the worst ; once taken no shadow of hope of their recovery and returning to their duty, till Land, Air, and Vegetables can be procured.

In 1776 Captain Cook created a sensation by returning from a three years voyage, having lost only one man by illness, and that not Scurvy. Following on the discovery of the anti-scurvy power of fresh fruits and vegetables, the British Admiralty ordered that a daily allowance of 1 oz. of lime juice or lemon-juice be issued to each seaman after the sixth week at sea. The result was dramatic. In 1760 there had been 1754 cases of Scurvy in the Naval Hospital at Haslar ; in 1806 there was one.

It was owing to this ordinance that British sailors were, and are still, known as "Lime-juicers" or "Limeys" in many American Marine ports. It was unfortunate, in some respects, that this name rather than "lemon-juicers" was applied to them, for it was later found that lemon-juice is far more potent against Scurvy than lime-juice. (Ordinary commercial concentrated lime-juice is a poor source of Vitamin-C).

To return, however, to our subject proper, a practical summing-up of what we have been saying, then is :—

(1) Groceries are mainly energy-foods.

(2) The body-building foods come from the butcher, the dairyman and the fishmonger.

(3) The protective foods from the dairyman, the greengrocer and the fishmonger.

(4) No food from one group can replace those in another, but only those in their own group.

(5) No food from one **class** in the protective foods can replace those of another class in that group.

If you keep by you the sheets giving the three different groups of foods etc., you can test your own daily diet, and see if it is lacking in any essential qualities. If so, it should be a comparatively simple matter to make some suitable substitutions, alterations or possibly additions. It is usually found, except where extreme poverty prevails, that the energy-producing and body-building foods are present to a sufficient extent in most diets. **The protective foods, on the other hand, are very apt to be neglected among all classes of society.** For instance many people never eat herring, or salmon, or sprats, or other of the so-called fat fish. These need not be eaten every day, but should form part of the menu once or twice a week. It may be mentioned here that the inhabitants of Tristan Da Cunha, a remote island in the Pacific, whose diet consisted mainly of fish and fish liver, on their first being discovered, had perfect teeth. It has been suggested that if there is an insuperable objection to any except white fish, cod-liver oil may be incorporated in the mayonnaise or other sauce used with the fish. Or the cod-liver oil may be added to the batter in which the fish is fried, without the eater being aware of it. It is further stated on good authority that cod-liver oil cannot be tasted if incorporated into gingerbread.

1. As it is the protective foods which are usually lacking in our diet, it is a sound principal **to begin with the protective foods** (since they are essential for health), and to ensure that they are included in sufficient amount. As far as can be ascertained, the following will supply the amounts required : (See Group II).

Class 1.

1 pint of milk per day.
1-2 ozs. of cheese.
1-2 ozs. butter (or margarine plus vitamins).
1 egg (though not essential).

One helping per day of the special fruits and
Class II. salads of table 1.
Class III. One helping of fat fish once or twice a week.

Some of you may be surprised to hear that adults can live on wholemeal bread, milk, green vegetables and potatoes for three months, and obtain apparently all that is necessary to sustain not only health, but appetite ! It is not suggested of course that you should stick to this Spartan regime, but it is well to know that it may suffice in an emergency.

2. On fish days, for example, the addition of potatoes with green vegetables or carrots will ensure enough of Vitamin A and some iron. If more body-building material is required, some cheese may be added.

3. The quantity and quality of the other two groups partaken of, namely body-building and energy foods will be regulated by the appetite and the length of one's purse.

It must be emphasized, however, as was pointed out very recently by a distinguished chemist to the Pharmaceutical Society of London, that it would be impossible to make out any kind of adequate diet unless it was based on one pint of milk per day. "Try as one might," he said, "to put together a diet which would be palatable on the basis of a smaller quantity of milk, one would fail." Milk was an excellent source of first class animal protein, and of calcium and phosphorus, and in summer a good source of Vitamin A. It was also one of the best sources of riboflavin and nicotinic acid, two protective substances of the Vitamin B group.

Another important point he brought out was that the amount of protective substance in a particular food varied according to the batch, the season, the soil and the country. In milk, for instance, the whole of one's Vitamin A requirement might be contained in two pints, but if it was very poor, winter milk, two gallons might be required to give the proper amount. To illustrate further, best summer butter contained about three times the vitamin content of best winter butter.

The following useful advice is culled from a recent practical book on diet (Davidson and Anderson) :

> "A reduced consumption of beef, mutton and bacon would be no nutritional handicap if the average consumption of milk were increased, particularly among the poorest sections of the community. Few people realise that about one-third of the milk produced in Great Britain is devoted to manufacturing

purposes. Attention should be drawn to the herring as a very cheap source of first-class protein and as a valuable source of Vitamins A and D, together with Calcium and Iodine. Attention should also be drawn to the dietetic value of orange meats, sometimes called "butcher's offal"—liver, kidney, tripe, tongue, sweet breads, heart and oxtails. These are palatable and valuable sources of proteins. Liver is the most useful foodstuff for blood-building purposes, being extremely rich in iron, and the specific anti-anaemia factor ; it is also a valuable source of Vitamins A, B, C."

In a recent paper by Mr. J. S. Abbott at the sixty-ninth annual meeting of the American Public Health Association it was urged that the misuse of skim milk constitutes an enormous economic waste. It contains all the essentials of whole milk except the milk fat and fat-soluble vitamins, and it even contains a certain amount of each of these, though not so much as whole milk. The Nutrition Committee of the League of Nations stated that, pint for pint skim-milk contains more calcium, phosphorus, iron and protein (though of course fewer calories) than whole milk, and is much cheaper. It is a good foodstuff for animals but to feed it to pigs is unsound economics because it requires ten pounds of food nutrients in skim-milk to produce one pound of food nutrients in the form of pork. Industry and leglislative endeavour to create a market for this wholesome foodstuff, says the American author, would be in the interests of consumers and dairy farmers alike, and there ought not to be any restrictions or discriminations against compounding skim-milk with other foodstuffs for use as human food in the manufacture of food products that supply a want of the people and that can be produced economically to advantage.

So that there are three foodstuffs in particular which I wish to recommend to you wholeheartedly, as their excellence is apt to be overlooked. They are : (1) **milk** (including skim-milk), (2) **cheese** and (3) **herring** (or other fat fish). It cannot be too much emphasized that cheese is a perfect and cheap substitute for meat, being derived from milk, which in a clean state, is a perfect body-building food. **We should cultivate a taste for cheese in this country,** because we are in the happy position to be able to supply it in adequate quantities from our own resources.

The energy foods form the largest bulk of what we eat, and fortunately there is a large variety to choose from. The cheap foods for energy are bread, most cereals (unless in fancy packets), sugar, flour, potatoes, dried peas and beans, treacle, syrup, margarine, suet. It is not economical to use fish and meat for energy foods, but if body-building foods are so used, cheese and herrings are among the cheapest, and milk is cheaper

than meat. **Economy in diet includes** substituting milk, herrings and cheese for meat. Not only are they cheaper for body-building and for the supply of energy, but they are protective foods as well, and meat has little protective power.

"If we range foods purely by their cheapness in providing energy, we find that next to the foods enumerated above comes the fat fish, cheese and bacon ; then imported meats begin to appear (led by 'scrag' end of Canterbury mutton) ; later appear the cheap joints of imported beef, and mingled with them the cheaper cuts of home produced mutton. Expensive from the energy point of view are nearly all fresh fruits, most vegetables and white fish, though of course some are dearer than others. Fortunately, however, we have our old standby, the potato, to give us the protective substance against scurvy which is provided in fresh fruits, and there should be a further supply available to us if we take care to grow plenty of fresh vegetables.

"What was written in 1938 concerning economy in food is still approximately true, viz.: **An economical dietary must be based upon cereals and cereal products** (bread, flour, oatmeal and things made from these), the pulses (peas, beans, lentils), dried fruits, potatoes, butter, margarine and suet, milk, herrings, cheese and bacon. Moderate economy only can be found in meat, while lean fish and eggs (unless home-produced) are costly and to be considered luxuries. Green vegetables and fruits (for energy) are also expensive (specially in towns), but as they are protective foods they are essential, and small quantities **must** be included in the diet." (Mottram - Food and the Family, 1938).

RATIONING.

Professor Mottram suggests that the housewife concerned about rationing should :

1. Never on any account decrease the supply of milk to her family but actually increase it.

2. Replace any meat lost owing to rationing by milk, cheese and fish (fat fish is best).

3. Use vitaminised margarine to replace any butter lost due to rationing.

4. Never omit one helping per day of some one of the raw fruits and vegetables enumerated above.

5. Replace some of the white bread of the diet by wholemeal bread to ensure enough vitamin B.

6. Use canned foods—fruit, vegetables and fish—if they can be afforded, when fresh supplies are short.

In this manner any food deficiencies due to rationing will be avoided.

HOW TO SPEND YOUR MONEY WISELY ON FOOD.

During the last war, the Food Administration of New York issued as part of its educational programme a simple suggested family food budget essentially as follows :—

Divide your money (for food) into fifths :—

One-fifth — Vegetables and fruit.
2nd fifth — Milk and cheese.
3rd fifth — Meats, fish and eggs.
4th fifth — Bread and cereals.
5th fifth — Fats, sugar, groceries and extras.

This is a desirable distribution but the amount spent on bread and cereals may have to be increased in the case of poor people. (Bread, oatmeal and maize are the cheapest forms of energy food).

But **whatever the amount of money available,** it would be wise to observe the two following rules :—

(1) At least as much should be spent for milk (including cream and cheese if used) as for meats, poultry and fish, and

(2) As least as much should be spent for fruit and vegetables as for meats, poultry and fish.

The ability of a food to satisfy the appetite is no indication of its value in nutrition. Milk and sugar for instance have a high power of satisfying the appetite, but there is a tremendous difference in their nutritional value. The following are recognised as rapidly satisfying hunger : Sugar, butter, potatoes, milk, meat, eggs, fat fish and other fatty foods. Foods with poor satisfying value are : bread, green vegetables and non-fatty fish.

Professor Drummond of London University has emphasized that "there is no security in placing trust in the belief that what is **vaguely** termed a mixed diet will protect against deficiencies in one or other food-stuff. It is unfortunately a view that is widely held and frequently expressed. There are many examples of the falsity of this belief." **The diet must, therefore, be planned to include those foods known to be rich in various essentials,** and from what has been already said, you should be in a position to do this.

I would like to emphasize at this point, with all the force at my command, the extreme importance of having an allotment or garden in these times of scarcity, in which to grow potatoes and vegetables, which you may remember, are among the protective foods.

As to the cooking of foodstuffs, I feel I must tread warily here lest I expose myself to a barrage from the more experienced female section of my audience. Nevertheless there are some facts which may be emphasised. Overcooking and twice cooking should be avoided. For instance 1 oz. of raw cabbage per day will protect one adult from scurvy. If the cabbage is boiled for 20 minutes, 4 oz. will be required to protect him ; if boiled for an hour, 10 ozs. will be required. **If it is boiled with soda for only a short time,** it will be valueless as a protective against scurvy. And here, at the risk of raising the ire of some of my audience, may I make a plea against this apparently widespread pernicious practice. Personally I find that cabbage and other greens cooked with soda taste strongly like Epsom salts ! — a taste to which I have a rooted objection, probably dating from my childhood days. I may add that my wife and I have had to make strong representations in our own kitchen, with many mutterings from the cook, before we finally succeeded in banishing entirely the soda from the vegetables.

It is, as you know, a common practice to add soda or bicarbonate to vegetables during cooking with a view to retaining the green colour. Well, soda and other alkalies are fatal to Vitamin C, one of the main protective substances for which we eat green vegetables. **There is, of course, no need to add soda,** as vegetables cooked for a short time, not more than twenty minutes, keep their green colour, have more flavour, and also retain much more of the vitamin than those cooked for longer periods.

Jam, it may be noted, which is made by long heating and stirring of fruits, contains no Vitamin C. Marmalade is made from oranges, a fruit normally containing a large amount of this vitamin, but the long cooking involved in its preparation destroys most of the vitamin. Cooking meat or potatoes or other vegetables twice usually destroys all trace of even the vitamins (e.g. Vitamin-B) which are fairly resistant to heat. The water in which vegetables have been boiled need not be wasted because it contains many of the minerals which have dissolved out of the vegetables ; it could be made into a thick soup with peas, beans, lentils, or potatoes ; or it could be made into a gravy and poured over meat.

In the present emergency, it is doubly important to use wholemeal bread instead of white bread. Quite good cakes can be made from wholemeal flour, and bran (a potent source of vitamin B1) can be made into excellent biscuits. I feel, however, that at this stage there is no great necessity to elaborate the virtues of wholemeal bread. Most of you will have seen the numerous references to this subject in the daily press, where it has been discussed in a fairly exhaustive manner. As a mere matter of interest it may be mentioned here that Hovis and Graham bread are made from flour containing the germ of wheat in addition to the ordinary constituents. The germ, which is really the most valuable part of the wheat from one viewpoint, is discarded from most wheaten flours, owing to its content of oily substance. The matter becomes rancid on storing, and thus gives the flour a disagreeable taste and odour. In rejecting the germ and the bran from wheaten flour the miller undoubtedly discards some valuable constituents, namely some protein, fat and mineral substances. To avoid this waste, methods have been devised to sterilize the wheat germ by steam. This process destroys a ferment which acts on the flour and also sterilizes the fat of the germ, thus preventing the flour from becoming rancid and acquiring an objectionable taste. The germ thus treated is ground to a fine meal, and of this one part is added to three of ordinary flour the mixture constituting **"Hovis" flour.**

"Graham flour," invented by the American physican, Dr. Sylvester Graham, alone contains the entire grain. In making "entire-wheat flour," the outer and more flinty layers of the bran are removed.

While there are good reasons at present for retaining a larger percentage of the whole meal in flour, there is one important point that must not be lost sight of, namely that **there appears to be something in all cereals which antagonises the calcification of bones and teeth.** The Mellanbys have shown that this property resides in the bran and the germ rather than the endosperm. For example on a diet which will produce rickets, a worse grade of the disease is produced if brown or wholemeal bread is used instead of white bread. Of the usual cereals used oatmeal is the worst but maize and wheat germ used alone produce worse effects still. Mellanby found that the exclusion of all cereals from a group of children practically averted the spread of caries of the teeth, whereas cod-liver oil added to the normal diet, did not do so completely.

Professor Mortam of London University points out that : "If cereals, particularly the germs of cereals, form a large part

of the diet, their rickets-producing action must be balanced by an increased intake of Vitamin-D. It is perhaps not the most humane of proceedings to persuade the working-classes to eat wholemeal bread, unless at the same time you persuade them to increase their too low intake of Vitamin-D. The gain in iron and vitamin B_1 may not make up for increased rickets and poorer teeth. **It is therefore essential to combine cereals in diet with foods such as milk or cheese which have large amounts of Calcium and Phosphorus,** for the Calcium of cereals is low in amount, and both Calcium and Phosphorus not in a readily available form."

Another authority points out that even a germ flour mixture such as is used in Hovis Bread contains only 40 mgrms. calcium per 100 grms. whereas milk contains 120.

For these reasons, you will note that in the sheet on "Infant Feeding" which has been distributed to you, the mother is strongly advised not to give her infant rusks, biscuits, white bread, arrowroot, rice, sago, tapioca, groats, porridge or any of the breakfast preparations of cereals.

If you can obtain skim-milk, remember that it is still a valuable food, even though most of the fat (with its vitamins) has been removed. It still contains a good deal of first-class body-building material and many valuable minerals. Do not, of course, replace your whole milk with skim-milk, just because it is cheaper, but buy some more in addition to your regular supply of milk, particularly if there are young children in the house.

A time has now come when imports of fresh fruits are being restricted, and the potato must be our chief source of vitamin C, together with home fruits and vegetables. We are lucky to have a plentiful supply in this Country, and we should see that our gardens are well stocked with potatoes, fruits and vegetables for the coming year. Potatoes are a valuable source of iron and vitamin C, and one of particular value, because they retain a high proportion of their protective substance after cooking. If the skin is removed from the potato before cooking, the minerals and vitamin C are lost in the cooking water. Fortunately it is the custom in Ireland (though up to recently considered rather barbarous in England) to cook potatoes in their jackets — a wise tradition duly handed down by our forefathers. If I may adapt to our own use, a verse from one of the British Ministry of Health's "Food Facts" as published in the daily papers :

"Those who have the will to win
Cook potatoes in their skin.
Knowing that the sight of peelings
Deeply hurts Jim Ryan's feelings."

Rabbit-flesh requires mention in view of the abundant supplies available at our door, added to which is the necessity to rid the farmer of this pest. It is rather poor in fat, and has, therefore, less energy-value then beef ; **but it is a valuable source of first-class protein** or body-building material. Accordingly if we wish to obtain our protein from meat, the rabbit is a cheap and readily-available form. From the food aspect, it is a gross mistake to class the rabbit as "vermin", a view unfortunately held by some people in this Country.

Most families who have to try and spin out their food resources use a **stockpot,** to which is added each scrap of spare meat, whether cooked or uncooked. This stockpot is reinforced daily by the addition of potatoes, peas, beans, etc. The soup from the stockpot has, of course, no particularly nutritious value apart from the substances comprising it, but serves to make good use of odd scraps of valuable food. **If about 1 oz. of grated cheese is added to the bowl of soup** before it is eaten, this will mean a further valuable addition to its nutrient value. If each child is given a bowl of this soup every day in addition to his basic diet, he will have been given all the materials necessary for his healthy growth.

Dr. Spence of Newcastle (England) says : "Children of all ages could live in health for many months on a basic daily diet containing no more than one pint of milk a day with 1 oz. of cheese, 6 ozs. of potatoes, some salad or green vegetables and one small helping of meat, fish or egg twice a week, leaving the appetite to be satisfied by bread — part wholemeal and part white — margarine, dripping and jam, oatmeal and pulses in the form of fresh or dried peas and beans. At this basic level of diet, a child should receive in addition during the winter months a teaspoonful of cod-liver oil or, failing that, 1 oz. of butter or a helping of liver or fresh fish."

Some authorities would like to see the above diet enlarged to include some fresh fruit daily, if obtainable.

It is well to know that in times of scarcity children's health may be safeguarded for a reasonable length of time on the above diet.

SUMMARY OF THE CONSTITUENTS OF FOOD.

Food contains :

1. **Proteins, fat and carbohydrates,** which supply energy by means of which we keep warm and perform work of various sorts. In addition, proteins are body building.

Proteins are of two sorts : first-class protein derived from animals and second-class protein derived from plants. First-class proteins are more economically converted into flesh.

Fats are of two sorts, animal and vegetable. They both have the same calorific value, but the animal fats usually contain vitamins A and D.

Carbohydrates include starches and sugars ; they are usually the cheapest form of energy.

2. **Vitamins.** Vitamins A and D are contained in animal fats. Vitamin A prevents eye troubles and protects against respiratory tract infections. Vitamin D prevents rickets.

Vitamin B_1 and the other "B vitamins" protect against beriberi and pellagra and certain nervous conditions. They are contained in yeast, wholemeal and germ bread, marmite, and green vegetables. Vitamin B_1 is not very much affected by cooking, unless it is cooked with soda.

Vitamin C protects against scurvy and infections. It is found in oranges, lemons and to a lesser extent in other fresh fruits and vegetables. It is liable to be destroyed by cooking.

Vitamin E occurs in wholemeal and germ bread and lettuce. Helps in the bearing of healthy children.

3. **Minerals.** Calcium and phorphorus are needed for bones and teeth, and proper functioning of muscle and nerve. Found principally, and in the best ratio to one another, in milk and cheese.

Iron is used in making blood and is obtained from meat, curry powder, egg yolk and liver.

Finally, it must be borne in mind that such items as **milk, fresh vegetables and fruit** are not, as some people seem to think, luxuries. They are in fact essential constituents of a satisfactory diet.

One could, of course, talk on this subject of food for hours. When the idea was originally broached to me, I suggested a **series** of lectures, but I think the sponsors were somewhat alarmed at this suggestion, so it was decided to try and give an outline of some helpful points instead. There are many important aspects of the subject that I have not been able to touch on, but then time is short, and I feel that I have kept you much longer than most of you really bargained for. I have included, how-

ever, in the sheets for distribution, a short summary of the more important points in "Infant Feeding", in the hope that it may be of interest to those concerned.

I can only trust that you have found this talk of some practical value, and now to conclude, in the words of an acknowledged expert in propaganda : "I thank you for your attention."

DISTRICT.	Expectant and Nursing Mothers.	Visits Paid.	Infants under 1 year.	Visits Paid	Children under 5 years.	Visits paid.
Annagry, ...	96	1,487	50	1,271	129	2,007
Ardara, ...	89	171	50	550	160	1,009
Arranmore, ...	55	876	30	519	87	925
Stranorlar and Ballybofey, ...	124	1,658	85	1,196	196	2,003
Ballyshannon, ...	47	413	47	631	221	2,491
Bruckless, ...	54	108	27	146	71	769
Buncrana, ...	74	124	84	210	196	760
Bundoran, ...	63	758	29	1,726	146	2,984
Carndonagh, ...	132	723	66	672	160	786
Carrigart, ...	78	881	43	692	162	1,670
Clonmany, ...	76	340	70	340	196	1,894
Convoy, ...	83	434	45	520	132	1,357
Derrybeg, ...	96	796	56	674	88	1,441
Donegal, ...	125	797	93	760	225	1,859
Doochary, ...	25	179	23	286	66	1,409
Drumholm, ...	115	1,489	55	980	112	689
Dunfanaghy, ...	42	352	32	379	112	969
Dungloe No. 1., ...	52	731	40	582	177	1,700
Fahan and Inch, ...	69	300	38	591	140	1,193
Fanad No. 1., ...	88	901	56	816	165	1,676
Fanad No. 2., ...	90	544	49	500	146	971
Frosses, ...	94	910	64	674	167	1,655
Glencolumbkille, ...	30	253	24	706	58	814
Gortahork and Falcarragh, ...	184	2,377	128	2 013	264	3,113
Kilcar, ...	40	1,108	22	316	99	1,188
Letterkenny, ...	169	989	162	1,683	359	1,744
Lifford, Clonleigh and Castlefin, ...	104	2,646	84	1,019	505	4,792
Malin, ...	60	228	36	268	180	800
Moville, ...	30	1,659	38	1,400	150	2,751
Muff and Upper Moville, ...	106	766	38	490	80	933
Ramelton, ...	125	1,034	71	957	69	1,485
Rathmullan, ...	72	918	42	732	108	2,237
Fintown, ...	24	96	20	148	107	428
Glenties, ...	49	324	34	510	168	732
Gortnasillagh, ...	18	72	10	176	36	428
Kincasslagh, ...	26	209	16	195	70	210
Manorcunningham (by Nurse Meehan), ...	—	—	9	9	34	34
By Supt P. N. Nurse Casey, ...	108	137	99	204	248	261

SUPERVISION OF MIDWIVES.

Miss Casey, Superintendent Public Health Nurse, reports as follows :—

124 Visits of Inspection were paid to 87 Midwives. The work of the Midwives on the whole continues to give satisfaction.

Handy-women were reported to have practised Midwifery in the Cross Roads (Falcarragh) and Killygordon Dispensary Districts. The cases were investigated and the Handy-women cautioned.

Three Midwives attended the Post-Graduate course in the Rotunda Hospital.

48 Visits were paid to Jubilee and Dudley Nurses in connection with Maternity and Child Welfare and Tuberculosis visiting.

7 Visits were paid to 4 McDevitt Nurses in connection with Maternity and Child Welfare activities. The work of all these nurses was satisfactory.

The following is a summary of the various notifications received during the year 1940 from Midwives practising in the County.

1.	Notification of Intention to Practise	97.
2.	Emergencies for which Medical Aid was summoned :—	
	Abnormal Presentations	35.
	Abortions (threatened and complete)	6.
	Albuminuria	2.
	Ante-partum Haemorrhage	10.
	Collapse of Patient after Delivery	2.
	Delayed Labour and Uterine Inertia	68.
	Eclampsia	3.
	Illness of Patient	3.
	Miscarriage	2.
	Placenta Praevia	2.
	Post-partum Haemorrhage	4.
	Premature Birth	5.
	Puerperal Pyrexia	4.
	Retained and Adherent Placenta	7.
	Rupture of Perineum	38.
3.	Notifications of Still Births	31.
4.	Notifications of Deaths	19.
5.	Notifications of Artificial Feeding	10.
6.	Notifications of Having Laid Out a Dead Body	3.
7.	Notification of Liability to be a source of Infection	3.

NOTIFICATION OF BIRTHS.

The following table shows the number notified to this department for the years 1937-1940, together with the total numbers of registered births as supplied to the Registrar General :

Year.	Notified to this Department.	Births registered.
1937	1,736	2 ,345
1938	1,896	2,536
1939	1,814	2,448
1940	2,008	2,629

We wish to remind those concerned of the legal obligation to report all births in the county to this department, as set out in the following legal statutes :—

(1) "In the case of every child born it shall be the duty of the father of the child, if he is actually residing in the house where the birth takes place at the time of its occurrence, and of any person in attendance upon the mother at the time of, or within six hours after the birth, to give notice in writing of the birth to the medical officer of the district in which the child is born, in manner provided by this section.

(2) "Notice shall be given by posting a prepaid letter or postcard addressed to the Medical Officer of Health at his residence, giving the necessary information of the birth within thirty-six hours after the birth, or by delivering a written notice of the birth at the Office or residence of the Medical Officer within the same ; and the local Authority shall supply without charge addressed and stamped postcards containing the form of notice to any medical practitioner or midwife residing or practising in their area, who applies for same.

(3) "Any person who fails to give notice of a birth in accordance with this section shall be liable on summary conviction to a penalty not exceeding twenty shillings.

The following section should be carefully noted :

(4) "The notification required to be made under the Act shall be **in addition** to and not in substitution for the requirements of any Act relating to the registration of births."

WELFARE OF THE BLIND.

The County Scheme administered by the Donegal Board of Health and Public Assistance is detailed in the previous annual reports. Briefly, it is as follows :—

1. A register of blind persons in the County is kept up-to-date.

2. Arrangements are made by the Board for the following :—
   (a) The education or industrial training of suitable blind persons between the ages of five and thirty years.

   (b) The employment in Workshops for the Blind of blind persons suitable for such employment, their maintenance in a Hostel, and the augmentation of their wages.

   (c) The maintenance in Homes, of blind persons, who owing to age or infirmity, are incapable of work.

3. The Board may, in the case of unemployable and necessitous blind persons ineligible for education or industrial training under the Scheme, and living in their own homes, or in lodgings, grant assistance to such persons in accordance with the following scale :—

	Per Week.
(a) Blind persons over 15 years and under 30 years of age	10/-
(b) Blind Persons 30 years of age and upwards with pension	4/- with pension.
(c) Married man under 30 years of age with wife dependent on him	15/-
(d) Married man 30 years of age and upwards with wife dependent on him	8/- with pension.
(e) Additional allowance for each child	2/6

The institutions approved by the Minister under the provisions of this Scheme are :—

	NAME OF INSTITUTION.	Class of Blind Persons Received.
1.	St. Mary's Institution for Female Blind, Merrion, County Dublin.	Females ; also boys up to 7 years of age.
2.	St. Joseph's Asylum for Male Blind, Drumcondra, Dublin.	Males.
3.	Richmond National Institution for Industrious Blind, 41 Upper O'Connell Street, Dublin.	Males.
4.	Cork County and City Asylum for the Blind, Infirmary Road, Cork.	Males and Females.

During the year 1940 assistance was rendered to blind persons in their own homes and in institutions at a cost of £283 17s. 8d. and £105 9s. 0d. respectively. The numbers in receipt of assistance at the end of the year were 29 in their own homes, and 6 in institutions for the blind.

COUNTY OF DONEGAL.

RETURN OF SAMPLES OF FOOD AND DRUGS ANALYSED DURING THE YEAR ENDED 31st DECEMBER, 1940.

NATURE OF SAMPLE.	No of Samples Taken.	No. certified to be adulterated	No of prosecutions.	No of Convictions.
Whole Milk ...	301	8	8	7
Buttermilk ...	12	—	—	—
Butter ...	65	1	1	1
Margarine ...	48	—	—	—
Cheese ...	23	—	—	—
Cocoa ...	9	—	—	—
Sugar ...	18	—	—	—
Jam and Marmalade	17	—	—	—
Bread ...	1	—	—	—
Flour ...	1	—	—	—
Intoxicating Liquor ...	108	3	3	—(a)
Tea ...	11	—	—	—
Vinegar ...	9	—	—	—
Rice ...	5	—	—	—
Cream of Tarter ...	5	—	—	—
Tapioca ...	1	—	—	—
Raisins ...	1	—	—	—
Bread Soda ...	4	—	—	—
Custard Powder ...	2	—	—	—
Baking Powder ...	1	—	—	—
Liquid Paraffin ...	3	—	—	—
Olive Oil ...	9	—	—	—
Castor Oil ...	3	—	—	—
Turpentine ...	1	—	—	—
Cod Liver Oil ...	3	—	—	—
Tomato Ketchup ...	1	—	—	—
Mincemeat ...	3	—	—	—
Sauce ...	1	—	—	—
Lard ...	15	—	—	—
Salad Cream ...	1	—	—	—
Cornflour ...	1	—	—	—
Sausages ...	3	—	—	—
Barley Bread ...	1	—	—	—
TOTALS, ...	687	12	12	8

(a) One prosecution for adulterated intoxicating liquor not disposed of at end of year 1940.

The following members of the Garda Siochana acted as Food and Drugs Inspectors in County Donegal during the year 1940 :—

Garda James Meegan, Letterkenny.
,, L. Connolly, Lifford.
,, P. J. Garvin, Newtowncunningham.
,, T. Maguire, Raphoe.
,, J. H. Flanagan, Buncrana.
,, M. Walsh, Moville.
,, P. Harvey, Muff.
,, P. McGurk, Carndonagh.
,, B. Garvey, Ballyshannon.
,, J. Dunne, Ballybofey.
,, J. P. Treanor, Pettigo.
,, A. Sarsfield, Dungloe.
,, M. J. Mealia, Clogher.
,, W. P. Arnold, Bunbeg.
,, C. Casey, Dunkineely.
,, M. Canny, Mountcharles.
,, P. O'Donnell, Carrick.
,, P. Egan, Milford.
,, R. T. Burke, Creeslough.
,, M. Burke, Falcarragh.

AIR RAID PRECAUTIONS.

In view of the long and protracted deliberations regarding the above, it is considered advisable to give a chronological summary including the more important points discussed. As will be seen at the moment of writing (April, 1941), the upshot of the discussions appears to be that all the Department of Defence are prepared to allow in the way of A.R.P. for County Donegal is the provision of a First-Aid Post and Firefighting equipment at Letterkenny.

30th November, 1938. The Local Government Department issued a circular "that arrangements are being made for safeguarding the population in the event of an air attack, and in connection therewith it is proposed by the Department of Defence to provide facilities for the instruction of certain medical practitioners in the medical treatment of gas casualities. It is considered very desirable that the County Medical Officer of Health should undertake a course of instruction of that nature so that he may subsequently act as instructor and give lectures on the subject to medical practitioners generally in his County."

The course of instruction was held at the Civilian Anti-Gas School, Griffith Barracks, Dublin, and lasted one week. It was duly attended by the County Medical Officer of Health.

5th September, 1939. First meeting of A.R.P. Committee held. Letters received from the Department of Defence setting out the provisions of the A.R.P. Act, 1939, and stating that it was the duty of each scheme-making Local Authority to prepare and submit to the Minister for Defence a scheme of Air Raid Precautions which should contain provisions in respect of such matters as might be prescribed by regulations made by the Minister.

Chief Superintendent McManus suggested that the local scheme of organisation should be divided into four sections, with central control operating from the County Council Office at Lifford.

The four sections would be :—

(a) Fire-fighting arangements.

This would include Fire Stations, auxiliary Fire Stations, the provision of fire alarms, fire posts, and fire patrols ; the recruiting and training of auxiliary firemen and such other personnel as may be required for the purposes of the Scheme ; arrangements in connection with the organisation of emergncy fire-fighting services, including the making use of natural or artificial supplies

of water for fire-fighting ; and the making of arrangements with existing fire-fighting services outside the area.

(b) Police and Warden Service.

The Police would operate under the control of the Chief Superintendent of the Garda Siothchana, and the Wardens under Head and Chief Wardens in each area.

The trained instructors in the Garda Service would be available for the giving of any necessary instructions and advice to the public as to Air Raid Precautions.

This service would also be used for the detection of poison gas, and for the recruiting of volunteers in the various Police Districts for the different duties arising under the Scheme.

The Police would also enforce the regulations in connection with the restriction and regulation of lighting in highways, streets, and public places.

(c) Health Services under the control of the County Medical Officer of Health.

This service would include Hospital arrangements for dealing with casualties ; first-aid parties ; sanitary arrangements ; the training of Doctors and Nurses ; the provision of casualty stations and ambulances.

(d) Engineering Services under the control of the County Surveyor.

This section would arrange for rescue work ; demolition work ; road repairs ; street cleansing ; arrangements for the decontamination of highways, streets, public places and buildings affected by poison gas and anything therein requiring decontamination ; and the continuance of the essential water and electricity supplies.

The Chief Superintendent elaborated on the duties of each Section, and the Committee unanimously decided to adopt the scheme of organisation outlined.

This scheme was approved, and it was decided to recommend that the Secretary of the County Council be appointed as Controller for the County. It was unanimously decided that the Secretary of the County Board of Health be appointed to take charge of the Fire-fighting arrangements section.

28th September, 1939. Letter received from the Department of Defence, Air Raid Precautions Branch, stating that it is proposed to issue respirators free to the public only in those areas, con-

sidered vulnerable, where intensive air raid precautions are being organised. They will be issued, however, only in the event of an immediate emergency, and when such a course is considered necessary. It is not proposed at this stage to make any provision for the issue of respirators to persons in Donegal. The question of evacuation is at present under consideration, and, if Donegal is included in the scheme, a further communication will be forwarded.

13th September, 1939. A fairly elaborate scheme was drawn up by the Committee and submitted for adoption to the County Council on 26th September, 1939, when consideration of it was adjourned by the latter body.

21th October, 1939. The Committee amended the proposed A.R.P. Scheme, and discussed the question of mobile First-Aid Units. This Scheme was finally adopted by the County Council and forwarded to the Local Government Department, who apparently took no further action. As far as can be ascertained no further mention of the Scheme was made until August, 1940.

22nd August, 1940. The following letter was received by the Secretary, Donegal County Council, from the Department of Defence :

I am directed by the Parliamentary Secretary to the Minister for Defence to inform you that he has considered the question of Air Raid Precautions Schemes for areas other than County Boroughs and the towns scheduled in the Air Raid Precautions Act, 1939. He has now decided that such schemes should include arrangements in respect of fire-fighting, first-aid, private shelters, and public instruction, with special reference to the principal city or town of each County, and to towns exceeding 4,000 in population. In your County, therefore, arrangements as above would fall to be made only in Letterkenny.

This Department will supply fire-fighting equipment, as soon as it can be obtained, for the town specified. It will consist of one light trailer pump, hand appliances, and protective clothing for each town. You should indicate at an early date whether suitable accommodation is available for the immediate housing of the trailer pump.

The supplying of fire-fighting equipment by this Department is intended to supplement the peace time requirements of the Local Authority. Authorities who have not provided reasonable peace time equipment will be required to pay for such portion of the equipment as represents their peace time requirements. In this connection I am to direct your attention to the Statute recently enacted in respect of the normal needs of Local Authori-

ties, viz., Fire Brigades Act, 1940. It would, accordingly, be possible for additions to be made to the County Fire-fighting equipment on the initiative of the local body.

The training of the necessary personnel should not be held up pending the receipt of fire-fighting equipment. I am, therefore, to request you to submit proposals for the training of volunteers to meet the service.

One first-aid post should be set up in the town referred to, and, if possible, the assistance of the Red Cross Society should be obtained in organising this service. I am to enclose a list of drugs and dressings which have been approved for first-aid posts in all areas, and which this Department proposes to purchase centrally. The drugs and dressings will be supplied to your Council on a repayment basis as soon as they can be obtained.

It is not necessary that public air raid shelters should be provided in your area. Every opportunity should be availed of, however, to stress upon all householders, whether in town or country, the importance of the provision of private shelters. Advice on the construction of these shelters is contained in this Department's pamphlet entitled "Civilian War Duties," a copy of which was recently handed in to every household.

As regards the question of public instruction you will be informed in due course what action it is proposed should be taken.

Before commitments are entered into on any A.R.P. service an estimate of the expenditure involved should be submitted to this Department for approval by the Parliamentary Secretary.

Regional Commissioner.

September, 1940. The Emergency Powers Order (No. 48), which has been made by the Irish Government provides for the scheme of Regional Organisation outlined by the Minister for Supplies in his broadcast on the 19th July.

The scheme as indicated by the Minister is intended to ensure that the business of the State would be carried on if a situation should arise where parts of the country might be cut off and unable to maintain contact with the central government as a result of invasion. The Order provides for the appointment of Regional and County Commissioners, which appointments have already been made by the Minister and publicly announced.

The Regional Commissioners will be responsible for the exercise of all functions of government, both central and local, in their respective areas if the scheme has to be brought into operation, and wide powers are accordingly conferred on them

by the Order. It is provided, however, that that part of the Order which vests powers in the Commissioners will come into force in a particular region only when the Taoiseach gives a direction to that effect in relation to that region.

The Order empowers a Regional Commissioner to requisition commodities and premises, but it is provided that a suitable form of receipt will be given to enable the compensation payable to be determined subsequently. It is intended that the power to requisition should be used only in an extreme case and, generally, the Commissioner will not interfere with the normal life of the community except to the extent that the conditions at any particular time will make it necessary for him to do so.

There will be no indiscriminate distribution of foodstuffs or relief by Commissioners in any circumstances. It will be the duty of the Commissioners to do everything possible to alleviate all cases of serious distress that may arise but they cannot be expected to provide for the needs of any families which might reasonably be expected to have laid in reserve supplies for their own use and are caught short through having neglected to do so.

Since their appointment Regional and County Commissioners have been engaged in surveying the position in regard to supplies, etc., in their respective areas and in making such preparations as are feasible to meet any emergency that may arise. The Government are confident that all sections of the community will realise the importance of making the best possible arrangements in advance and that the Commissioners will receive the fullest measure of co-operation and support from all citizens, both as individuals and as members of organised bodies.

17th February, 1941. A fire-fighting scheme for the County which, it is estimated, will entail an initial expenditure of close on £8,000, together with annual charges in respect of maintenance and other items, and will mean a levy of about 1½d. in the £ on the rates, was adopted by the Donegal County Board of Health.

The scheme adopted was outlined in a report submitted by the County Surveyor, Mr. T. MacMahon, and the Board's Engineer, Mr. W. J. Doherty, who stated that the recommendations they were making dealt with the normal peace-time requirements of the county, with particular reference to the area over which the Board had responsibility.

In general their proposals were :—

1. To provide a quantity of fire hose, standpipes and branch pipes in every town or district in which there was water in mains,

under pressure, for dealing with small or medium fires and to keep larger fires in check until outside assistance arrived.

2. The provision of one mobile unit and fire trailer pumps situated at suitable points to render the assistance referred to above and to deal with fires in their own immediate vicinity.

3. Agreement with such Urban Councils as were in a position to offer protection to county areas.

An agreement with Derry Fire Brigade on similar lines to that proposed for Urban Councils.

5. The standardisation throughout the county of hose couplings, standpipes and appliances of this kind as far as might be practicable and the use of "adaptors" for these appliances where complete change would be too expensive.

6. Provision for the housing and care of all machines and appliances.

7. Formation of Fire Brigade crews to train, drill, attend fires and look after the plant.

The report recommended the provision of fire hose, standpipes, and branch pipes at Moville, Ballyliffin, Ramelton, Rathmullan, Kerrykeel, Milford, Carrigart, Kilmacrenan, Falcarragh, Stranorlar and Ballybofey, Glenties, Ardara, Mountcharles, Ballyshannon, Pettigo, Ballintra, Carrick, Fahan and St. Johnston.

Regarding the provision of a mobile unit and trailer pumps, the report proposed to have five centres in the county, in addition to such as would function under the proposed agreements with Urban Councils and Derry Corporation. The county centres proposed were Carndonagh, Donegal Town, Killybegs, Dungloe and Dunfanaghy and the Urban Councils suggested were those of Letterkenny and Bundoran. In regard to Letterkenny Council, they found that a considerable portion of the area it could usefully serve would be covered in the agreement with the Derry Corporation. Buncrana Urban Council had no services to offer at present.

They had been informed by the Chief Officer of Derry Fire Brigade, the report went on, that in general the Brigade's services would cover approximately 25 miles distance by road from Derry, but that a fire a few miles over that distance would be dealt with. The specific towns proposed to be covered by the Derry Brigade were Carndonagh, Culdaff, Moville, Rathmullan, Kerrykeel,

Milford, Kilmacrenan, Ballybofey, Stranorlar, Castefin and Lifford and all within that area. They had taken the view that, in the area served by the Derry Brigade, trailer pumps or mobile units or such like plant were not required as a brigade which was standing ready for a call would likely be on the scene of a fire as soon as a local pump could be in action. The hose and equipment suggested for these towns should be all that was necessary. There was, however, the northern section of the Inishowen peninsula, which was outside the Derry Brigade's area, and for this reason they recommended a light trailer pump at Carndonagh. From this centre, the pump could be used also for holding a fire in check until the Derry Brigade arrived.

In regard to Bundoran Urban Council, where a trailer pump and other equipment was available, it was proposed that Ballyshannon and Pettigo be covered in an agreement with this Council. These towns would also have the benefit of the mobile unit at Donegal Town.

For the lower end of Fanad and probably other districts adjoining Letterkenny it should be possible to arrange for a useful and efficient service from Letterkenny Urban Council in consultation with that body.

Referring to the manning and maintenance of the plant, the report suggested a crew of ten men (minimum seven) for the mobile unit at Donegal, eight men (minimum five) for heavy trailer pump and six men (minimum three) for each light trailer pump. The men selected should be persons likely to be readily available. One station officer should be in charge and his permission should be obtained by any of the men who wished to absent himself from the district. The officer would be paid, say, £6 per year and the men £3 each. Pumps and engines would require to be run twice per week for testing purposes, drills arranged and it would be the duty of the crew to keep the plant in order. Drills and attendance on fires would be paid for at hourly rates and further detailed duties would be prescribed.

The estimated cost of the plant and equipment suggested in the report was £7,931 5s. 0d.

"We trust," the report concluded, "that though the report may not cover every aspect of the works which will be necessary to provide fire protection in areas referred to, it will give the Board an idea of the extent of the proposed undertaking and that it will serve as a basis for formulating such a scheme as the Board may consider it advisable to put on hands."

Captain J. Scott, pointing out that the report provided for only one mobile unit in Donegal Town, said it had been suggested that there should be two mobile units, the second being at Carndonagh. The two most vulnerable points in the county, to his mind, were Moville and Buncrana, and his idea in having a mobile unit at Carndonagh was so that, even in case of emergency, it could co-operate with the Derry Fire Brigade and specially with Buncrana, which, at the moment, had no fire-fighting apparatus whatever.

The County Surveyor said the view Mr. Doherty and he had taken of that suggestion was that the Derry Brigade would serve the district quite well in peace time. The Derry Brigade would be on the scene quicker than any of their own partly trained units.

This scheme, it was emphasised at the meeting, was purely a peace-time scheme as required by the Fire Brigades Act, 1940 : and additional provisions would require to be made for conditions arising out of possible air-raid attacks.

18th February, 1941. Meeting of Air Raid Precautions Committee to consider A.R.P. in the light of the following :

In accordance with the provisions of Section 12 of the Air Raid Precautions Act, 1939, the County Council is required to prepare and submit to the Minister for Defence a scheme of Air Raid Precautions which shall contain provisions in respect of such matters as may be prescribed by regulations made by the Minister.

Under the (Prescribed Conditions) Regulations made by the Minister for Defence on the 24th August, 1939, the Scheme shall contain provisions in respect of the following matters :—

(a) the giving of any necessary instruction and advice to the public as to Air Raid Precautions ;

(b) arrangements for dealing with casualties ;

(c) arrangements for or in connection with the restriction and regulation of lighting in highways, streets, and public places ;

(d) arrangements in connection with any transfer of the civilian population pursuant to any direction given by the Minister for Defence ;

(e) the organisation of an emergency fire-fighting service ;

(f) arrangements for making use of natural or artificial supplies of water for fire-fighting ;

(g) the recruiting and training of auxiliary firemen and such other personnel as may be required for the purposes of the Scheme ;

(h) arrangements for securing the use of such vehicles as are required for the purposes of the Scheme and adaptation thereof where necessary ;

(i) the provision of appliances, equipment, and material required for the purposes of the scheme, other than equipment as may, in pursuance of Section 60 of the Act, be sold, supplied free of charge, or lent to the local Authority by the Minister for Defence ;

(j) the storage and maintenance of such appliances ; equipment, and material as are provided under the immediately preceding paragraph of this Article ;

(k) arrangements for the detection of poison gas ;

(l) arrangements for the decontamination of highways, streets, public places and buildings affected by poison gas and anything therein requiring decontamination.

A scheme was adopted and submitted to the County Council.

25th February, 1941. The latter approved of the scheme and it was forwarded to the Ministery.

31st March, 1941. A letter was received from the Department of Defence, dated 31st March, 1941, referring to the report of the Air Raid Precautions Committee of the County Council and pointing out that the A.R.P. Scheme which will be approved by the Parliamentary Secretary under the Air Raid Precautions Act, will provide for Public Instruction, Private Air Raid Shelters, First-Aid and Fire-Fighting, and the County Council are only required to organise actively the two last-mentioned and locate them at Letterkenny for the benefit of the entire county. It is, therefore, emphasised that only approved expenditure on the First Aid Post and A.R.P. Fire-fighting Services at Letterkenny will rank for A.R P. grant.

HOW TO PURIFY YOUR DRINKING WATER.

"Water undertakings throughout the country have taken all possible precautions to enable them to maintain a constant supply of pure water. In spite of this it is possible that, in places where air raids are severe, the water system may get damaged

and this may result in contamination of the water, or even in a temporary interruption of the supply. Should there be any doubt about the purity of the water supplied to your district you will be notified.

It is, therefore, important that you should know in advance what to do should the water supply become comtaminated, or should you find it necessary to use impure or doubtful water from wells, ponds or streams.

Drinking impure water may cause illness. Typhoid fever is one of the diseases most likely to be spread in this manner. It is a serious disease, and should it occur the patients would occupy hospital beds which might be urgently required for other purposes.

It is, therefore, the duty of every citizen to learn to do what the Army already does — to purify impure water so that it will be safe to use for drinking, for preparing foods, and for washing utensils which are to be used for food or drink.

Well, how can you do this ?

It is really quite a simple matter. Firstly, you can boil the water and then it will be quite safe to use. But supposing you can't boil the water because the gas and electricity services have also been damaged, then there is another safe, quite harmless and simple method which you can use. It is used by the Army.

Keep in your house a bottle of chlorinated soda solution. Your chemist can supply you with it. Milton or Chlor-San will do as well. Buy also a small packet of photographic hypo. These materials are cheap and can be obtained from all chemists and many stores. On no account should you use any other disinfectant for purifying water, unless you are recommended to do so by a qualified chemist.

Now, to purify your water if you can't boil it, add ten drops of chlorine disinfectant to one pint of water. (Remember that a household tumbler holds half a pint). Stir or shake and allow to stand for not less than five minutes. Then add a crystal of hypho and stir until the hypho is dissolved. The water is then safe to drink. But remember this — after purifying the water, whether by boiling or by chlorine, keep it in a clean receptacle until required for use.

For washing utensils and foods which are to be eaten uncooked, such as salads and fruits, you will require to purify a larger quantity of water, and this may be done in a clean bucket. The ordinary bucket holds about two gallons of water. To purify

a bucketful add two teaspoonfuls of the chlorine disinfectant and stir thoroughly. After standing for five minutes or longer, add two or three crystals of hypo. The same method may be used for purifying water in larger containers, provided the disinfectant is added in the proportion of not less than one teaspoonful to a gallon of water, followed after the necessary five minutes interval by sufficient hypo to remove the taste of chlorine.

The disinfectants I have mentioned have been chosen because they all contain chlorine, which, although it gives an unpleasant taste to the water, is quite harmless. The hypo is added only to remove the taste of the chlorine. If you add too much chlorine or hypo it doesn't matter ; if too little hypo is used you will still taste the chlorine, and if you don't like it add another crystal of hypo. You must, however, remember to add the chlorine **before** the hypo.

The reason why you must not use disinfectants other than chlorine for the purification of water supplies, unless they are recommended for this purpose by a qualified chemist, is that many of them contain substances which are harmful, or which make the water taste unpleasantly.

I want you to get these substances at once, and to try out the method once or twice in your homes just to assure yourselves that it is perfectly simple and that you don't object to the taste.

I hope you may never need them, but if you do you will need them badly." (Radio Broadcast 13/8/1940).

Air Raid Precautions.

Every attack from the air may take any or all of the following forms :—

1. High explosive bomb.
2. Incendiary bomb.
3. Bomb which liberates poison gas.
4. Spraying of mustard gas from low altitude by aircraft.
5. Machine-gun fire from low-flying aircraft.

All the above, with the exception of 3 and 4 have, so far, been used by combatants in the present war, usually a combination of all three methods being used at once.

Of all these the high explosive bomb is the most deadly. It may weigh anything from ten pounds to a ton, or even up to two tons on occasion. The damage done by these bombs is due to splinters, blast, shock or all three combined. The splinters are of varying sizes (when a bomb bursts), and being of an irregular shape they make much larger wounds than rifle or machine-gun bullets of the same size. The greatest danger is from a bomb bursting on the ground. The splinters fly out in all directions and may cause an appalling number of casualties in a crowded street.

The blast (due to liberation of hot gases) from a bomb bursts the metal casing, and pushes everything in the neighbourhood before it with almost inconceivable force. The air in front of these gases is pushed forward at a speed of about four thousand miles an hour, twenty times the speed of the most violent hurricane. A man standing within ten yards of a large bomb will be torn to pieces, and the pieces thrown hundreds of yards. A brick wall is not merely thrown down, it is converted into a hail of projectiles which may kill people at a distance. Blast may break windows up to a quarter of a mile or so away.

Panic may cause deaths directly as seen in fire disasters in cinemas and crowded buildings. Under war conditions, however, the indirect effects of mass panic may be very serious, as exemplified on the continent in the early stages of the present war. If hostile planes can get the population on the run, they can machine-gun them from low altitude and attack with light bombs which fragment into innumerable splinters on hitting the ground. Panic is very hard to resist, and for this reason the public require much instruction in anti-panic measures. The most important of these is of course, the provision of adequate shelters and trained fire-fighters. In air-raids on Spain in 1938, before bomb proof shelters had been put up, people were seen to lose their heads completely, and some even tried to dig holes in the street.

Measures for the early detection of hostile aircraft, efficient black-out measures, fast fighting defensive planes, balloon barrage are of great assistance in keeping up public morale. **The provision of good anti-aircraft guns is most important,** combined with powerful searchlights. The importance of these last two cannot be over-estimated. Their work is only too well realised after an attack on an imperfectly-defended town or city.

Evacuation.

J. B. S. Haldane wrote in 1938 (of England) : "If the necessity for larger scale evacuation arose next week, it would be carried out not by the Government or any other authority, but by millions of terror-stricken individuals blocking the railway stations, congesting the roads, and dying by hundreds, even if they were not attacked from the air, of accident, disease, fatigue and even starvation. **This is what happened in Spain and China."**

It is worth noting that even a small hollow or ditch a foot deep is very much better than nothing if one is caught by bombing planes in the open. Steel frame buildings afford good protection. If these are not available, a solid stone house affords reasonable protection. A really strong cellar makes a good air-raid shelter, and trenches proved very valuable in Spain. Haldane recommends brick-lined passages at a minimum depth of 60 feet below the surface, and considers they would be safe even against one-ton bombs. From his experience in Spain, he gives the following account of unorganised evacuation :

'Quite often a whole population sets out along the roads. From time to time an aeroplane kills a few with light bombs or machine-guns. The survivors scatter into fields. But they must go on. So they soon come back to the road. The more optimistic have attempted to carry something, if only a change of underclothing. Soon everything except the babies is dropped. Boots wear through. Then the skin of the feet wears through. Of course if one is in luck one may find a pair of boots to fit one on a dead man or woman. It is not pleasant to walk on wounds, but it can be done, and is done. It would be easier if one had food to sustain one. If a family is separated during one of these migrations, it is very possibly separated for ever. Perhaps it is better not to write about these things. But evacuation is something quite different from a bank holiday excursion."

Any country is practically at the mercy of attacking planes unless adequate shelters are provided. As Haldane insists, "To build an air fleet and no shelters is like building battleships with no armour, or sending an army into the field armed with the latest artillery and machine-guns, but with no spades for digging trenches." Given an adequate system of shelters, the bombing aeroplanes loses practically all its effectiveness as an instrument of terrorisation, and the belligerents would need to concentrate on a starvation blockade or direct invasion as the only really effective weapons left against an island people.

Poison Gases.

These have occupied a rather disproportionately important place in the public mind. Practically complete protection is afforded by the modern gas-mask. The latter, therefore, nullifies the panic — making effect of gas in crowded communities even more effectually than the properly constructed air-raid shelter defeats the terrorist tactics of the bombing plane. The high explosive and incendiary bombs are the real danger, as we can see only too clearly from daily reports of raids across the water.

A medical officer in a reception area recently gave the following description of casualties treated :

"Many of us have seen and treated badly injured civilians brought to hospital as a result of road, railway or works accidents in peace time. It seems to me, however, that only those who have had to deal with victims of air raids can conceive the appalling condition and appearance of many of these patients on their arrival in hospital. A sight which must be seen to be appreciated fully is the almost indescribably filthy condition of many who evidently have been clean and well clad. A patient is brought to the receiving ward with her clothes cut and torn to shreds, her hair singed, filled with dirt and matted with blood and cement dust, her body and limbs covered with grit and oil, her face blackened, bruised and bleeding. Her eyes, nose, lips and ears filled with dirt, her head bandaged, and her limbs immobilised by improvised splints at the first-aid post. Truly it is a picture not easy to forget."

IRISH RED CROSS SOCIETY.

A meeting was held in Lifford on 5th December, 1939, to form a branch of the above in County Donegal. Senator David L. Robinson addressed the meeting, and gave an informative talk on the objects of the Society laying especial stress on its international character. It was thereupon decided to start a county branch, and a County Committee was appointed, with the Secretary; County Council, as Secretary.

The Society has grown in a remarkable manner since its inception, and branches have been formed in the following places : Ardara, Ballybofey, Ballyshannon, Buncrana, Carrick and Kilcar, Carrigans, and St. Johnston, Carrigart, Carndonagh, Donegal, Dungloe, Fahan, Glenties, Kilmacrenan, Killybegs, Letterkenny, Lifford, Malin, Malin Head, Milford, Mountcharles, Moville, Narin and Portnoo, Ramelton, Raphoe, Rathmullan, Four Masters' (Donegal), Drumholm, Gweedore, Muff, Convoy, Termon, Killaghtee, Creeslough, Annagry, Dunfanaghy, Kincasslagh, Burtonport. Practically all of these have organised classes in First-Aid and Home Nursing, and a fair number of the members have obtained the Society's certificate in one or both of the above.

The importance of this lies in the fact that A.R.P. connotes a well trained personnel, otherwise it is largely nullified. Accordingly every endeavour has been made to speed up the formation of classes and thus to augment as quickly as possible the growing numbers of trained First-Aid workers.

Owing to his appointment as County Commissioner, Mr. Sean D. McLaughlin, because of pressure of work, was compelled to resign his position of County Secretary of the Red Cross Society. His resignation was received with great regret as he had done sterling work in the difficult initial stages of the formation and organisation of the Society. Dr. Bastible, County Medical Officer of Health, was appointed as his successor.

Several ship-wrecked crews have been cared for by the Society since the outbreak of the war, and many refugees from overseas have been cared for on their way through the different points where the Society functions.

The question of the setting-up of First Aid Posts has given rise to a good deal of confusion in the public mind, as the three

authorities, namely, the Department of Defence, the Local Authority, and the Irish Red Cross Society appear to overlap to a certain extent in this connection. However, the overlapping is only apparent and not real, as all three authorities are in close touch with each other, and no duplication of posts is likely to occur. The preliminary inquiries, however, necessarily set on foot by all three independently, and at different times, have been very confusing even to Branch Secretaries and to County Committees. Accordingly it may be well to publish the following circular issued by the Irish Red Cross Society on 9th September, 1940.

CUMANN CROISE DEIRGE NA hEIREANN
IRISH RED CROSS SOCIETY.
20 Merrion Square, N.,
DUBLIN.

9th September, 1940.

FIRST AID POSTS.

The question of the establishment of First Aid Posts throughout the County has been so often raised that we think it desirable that our members should understand the position of the Society in regard to this matter.

The General Purposes Committee of the Society takes the view that it is desirable that in each area there should be set up a sufficient number of First Aid Posts to deal with any casualities that may arise.

It must be realised that the setting up of a First Aid Post should not be lightly undertaken, the equipment is expensive and furthermore a First Aid Post cannot be effective unless there is a trained staff of workers to man it. Care should also be taken that there is no unnecessary duplication of First Aid Posts nor should they be set up in any area unless there is a reasonable risk of such a post being needed.

NUMBER OF POSTS AND THEIR LOCATION.

County Secretaries have already been asked to furnish to Headquarters particulars of the number of First Aid Posts which they think are required in their County and the suggested location of same (Circular letter No. 45).

The number of Posts which are to be set up in any particular area depends upon (a) the population of the area, (b) the likelihood of its becoming the scene of operations in the event of war, and (c) the likelihood of it being made the object of attack from the air.

In connection with the number and location of Posts the guidance of the Military Authorities or Local Security Force should be sought. If such guidance is not available Branches must rely on the practical commonsense of their members.

RESPONSIBILITY FOR THE ESTABLISHMENT OF FIRST AID POSTS.
PRIMARILY RESTS ON THE LOCAL AUTHORITY AS PART OF A.R.P. PREPARATIONS.

Enquiries should therefore be made as to what steps have been taken by the Local Authorities or other bodies to establish Posts in your area. If a sufficient number are being established and equipped it will only be necessary for this Society to offer assistance in providing workers (see "Personnel for First Aid Posts").

Where, however, it is clear either that the Local Authorities have not taken, or will not take within a reasonable time, steps to establish the necessary number of Posts, or where the number of such Posts or their equipment is inadequate, the Society is prepared to establish First Aid Posts and to equip them or to supplement any efforts which have already been made in this direction.

PROVISION OF PREMISES FOR FIRST AID POSTS.

It is felt, however, that the Society should not be called upon save in exceptional circumstances to provide Premises for First Aid Posts. Where the Local Authority has failed to provide posts it should be informed that the Society is prepared to equip and man Posts provided suitable Premises are placed at their disposal. In this connection we have been informed by the Local Government Department that they are prepared to authorise Local Authorities to place at the disposal of the Society suitable Premises which are under the control of Local Authorities such as the Local Dispensary.

SUITABILITY OF PREMISES.

As regards the suitability of Premises it is difficult to give precise direction as conditions will vary in each area. The Medical Members of your Committee should be able to say whether premises are suitable or not and their advice may be acted upon.

PERSONNEL FOR FIRST AID POSTS.

The Local Branch of the Society should be in a position to provide the necessary trained personnel to staff not only such Posts as the Society may find it necessary to establish itself but also Posts established by the Local Authorities. We would repeat that no First Aid Post can be effective unless manned by a fully trained staff of workers, and Branches should, therefore, concentrate on having as many of its members as possible trained in First Aid and Home Nursing.

EQUIPMENT FOR FIRST AID POSTS.

You will find enclosed a list, drawn up by the Medical Committee, of suitable equipment for Posts to serve areas of different sizes.

PLEASE NOTE : It should be borne in mind that no First Aid Post should be established without the sanction of Headquarters and that no commitments should be entered into for equipment until this sanction is obtained as some of the items may be available from Headquarters.

AMBULANCES.

Next in importance to the establishment of First Aid Posts is the provision of an adequate ambulance service. It may well be that serious casualities can receive little benefit from attention at a First Aid Post and should be rushed to Hospital as soon as possible. Apart from this, the collection of casualities and their conveyance to the First Aid Post can hardly be effective without a proper ambulance service.

You will have observed that a campaign to provide permanent ambulances in addition to emergency vans has been launched and that in the Dublin area it has met with considerable success. We are hoping that you will endeavour to have the lead given in Dublin followed in your area.

We must stress the need for training personnel in preparation for ambulance service. It is hoped that out of the number of ambulances presented to the Society one or two may be assigned to your area. Should this be possible a squad of properly trained workers must be ready to take over such an ambulance and provide an adequate unit to man it. When sufficient members have been trained they should be formed into Divisions or Units (Rules for the Organisation of Irish Red Cross Divisions and Detachments have now been drawn up and will shortly be issued to all County Secretaries).

A WORD OF WARNING.

Recent war experience has shown that First Aid Posts may defeat their own object if attempt is made there to treat serious wounds instead of rushing the injured to hospital. It has, in fact, been found and the greater portion of casualties caused in air raids are of such a serious character that delay in First Aid Posts may prove fatal. While, therefore, Posts may be of great value in dealing with minor injuries it should be realised that they must confine their activities to this work. Correspondingly the importance of a quick and efficient ambulance service has increased and all members should endeavour to ensure that if an emergency arise in their area the ambulance service is competently staffed and ready for speedy action.

In view of the latest pronouncement of the Department of Defence on the proposed Air Raid Precaution Scheme for County Donegal (cited under Air Raid Precaution) it would seem that the County Red Cross Society will have to try and arrange for the formation of First Aid Posts throughout the County, with the exception of Letterkenny.

Treatment of Drowning and Electrocution.

Mr. Reginald T. Payne points out that the conditions present in drowning and electrocution are quite similar and therefore require the same treatment. Both are forms of asphyxial death or suspended animation in which the ordinary tests for death are fallacious, and the treatment is immediate, prolonged and persistent artificial respiration. There are two modes of death from drowning. In one a little water enters the larynx during the period of apnoea and leads to laryngeal spasm ; in the other spasm does not occur but a variable amount of water enters the trachea, bronchi and lungs. The asphyxia is due to waterlogging of the lungs. In other cases there may be a combination of laryngeal spasm and waterlogging. In all cases blood is dammed back in the right heart and venous system, while the left heart and arterial system are relatively empty.

In drowning accidents the victim is unconscious and not breathing, the pulse cannot be felt, and the heart sounds are inaudible. It cannot be too strongly stressed that the ordinary signs of death are fallacious. In all cases the cardiac complexes remain for a considerable but undetermined period of time after the heart sounds have ceased to be heard with the stethoscope. Hence the stethoscope is a poor guide for determining whether a drowned person is or is not beyond the possibility of resuscitation. The same applies to apparent death after electrocution.

After what period of immersion in water is recovery possible? There is no exact answer. The popular belief that recovery is impossible after immersion for four to five minutes is entirely wrong. Recent evidence suggests that it is possible to be submerged in water up to half an hour and still live. All victims of drowning must be given the benefit of the doubt, and death never assumed until rigor mortis, body cooling, or post-mortem staining appears. After removal from the water all signs of life may be absent for hours, yet the person may ultimately recover.

The following are some of the details of treatment : (1) Lift up the victim by the waist and allow water to run out of the mouth, pharynx, stomach, larynx, trachea, and lungs. (2) Lay the victim face downwards, preferably on some slightly sloping ground, with the head rather lower than the feet. (3) Pay particular attention to clearing the mouth, as victims of drowning are likely to have the passages obstructed by weeds, etc. (4) Start artificial respiration (of which Schaefer's method offers advantages) at once, and continue this until recovery takes place

or the unequivocal signs of death, mentioned above, appear. (5) Apply such of the adjuvants to artificial respiration as warmth, massage of the limbs towards the heart, coramine, etc.

Electrocution may be due to lightning or any type of electrical accident. It is often too readily assumed that the risks to life bear a simple relation to the voltage. The voltage factor is only one of many factors, such as perfection of contact, the duration of flow, moisture of clothing and skin, resistance offered by the body, and even psychological factors, such as awareness of the possibility of a shock.

These accidents, whether due to natural or to technical electricity, act in three ways. First, by passage of the current through the central nervous system they produce unconsciousness and acute bulbar palsy ; secondly, they produce electrical burns ; and thirdly, fractures may result from the violent and spasmodic contraction of muscles.

From the point of view of first-aid it is to the injuries to the central nervous system that attention must be directed. The victims are often rendered unconscious by the passage of the current, or they may still be conscious but unable to release themselves from the contact. They are, however, rarely killed outright by the electric shock. If unconscious, they are in a state of suspended animation. Respiration has ceased, the pulse is absent, the heart sounds are inaudible and the normal reflexes can no longer be elicited. According to the ordinary clinical tests they appear to be dead ; but they are not, though they will certainly die if left untreated. Death is due to acute bulbar palsy which may lead to failure of the heart or of the vasomotor or respiratory system. As in drowning, electrical conductivity of the heart persists for a considerable time and normal rhythmical activity may be restored by prompt artificial respiration.

The treatment of electrical accidents includes freeing the victim from electrical contact ; treatment of suspended animation ; treatment of cerebral oedema, electrical burns, fractures and other injuries. The victim must be freed from electrical contact as rapidly as possible. This involves cutting off the current or removing the victim from the contact, whichever is quicker. Many fatalities can be prevented by cutting off the current the moment the accident is recognized. If this is not possible, the victim must be dragged away from the contact, care being exercised lest rescuers be electrocuted also. This may be carried out with rubber gloves or hands carefully padded with newspapers, or by means of non-conductors such as a dry stick, broom handles, dry rope, or a dry coat. When this is impossible it may be necessary to sever the source of electrical energy with an insulated tool such as an axe with a long wooden handle.

Immediately the victim is freed from the electrical contact artificial respiration must be started and continued till normal respiration is established or unequivocal signs of death appear. The victim is in a state of suspended animation due to acute bulbar palsy from which recovery is highly probable if immediate, prolonged, and persistent artificial respiration is carried out. No attention should be paid to the information that the voltage producing the shock was particularly high or that artificial respiration has been carried on for several hours without result. Bates has recorded a case of recovery from an electrical shock of 80,000 volts after artificial respiration has been carried out for 8 hours. The victim must always be treated on the spot and no attempt be made to move him at this stage. At the same time such adjuvants to artificial respiration, as mentioned above, should be applied.

BURIAL GROUNDS.

List of Burial Ground Caretakers in County Donegal.

Burial Ground.	Name of Caretaker.	Address.	Salary. £	s.	d.
Finner, ...	Patrick J. Quinn,	Finner, Bundoran.	4	0	0
Teetunny, ...	George Clarke,	Teetunny, Ballyshannon.	2	0	0
Killymard, ...	Isabella Irwin,	Dromore, Donegal.	2	0	0
Carn, ...	James Cathcart,	Pettigo.	2	0	0
Inver, ...	Thomas Mullan,	Inver.	1	10	0
Dunkineely, ...	Jas. Henderson,	Dunkineely.	4	0	0
Donegal Abbey	Ant. Gillespie,	Donegal.	5	0	0
Old Ray, ...	Andrew Harkin,	Ray, Falcarragh.	1	0	0
Tullaghobegley,	Manus Siyes,	Falcarragh.	1	0	0
Clondahorkey No. 1, ...	James McBride,	Rinclevan, Dunfanaghy.	1	0	0
Clondahorkey No. 2, ...	Moses Campbell,	Dunfanaghy.	1	0	0
Doe Castle, ...	Barney Boyle,	Doe Castle, Cresslough.	1	0	0
Magheragallon,	Jack Curran,	Derrybeg.	1	0	0
Milltown, ...	Thos. Canning,	Burt.	2	0	0
Drumhaggart,	Wm. Slater,	Muff	2	0	0
Grange, ...	James Reilly,	Grange, Burt.	2	0	0
Fahan Old, ...	Rev W. G. Dixon	Fahan.	2	0	0
Eskaheen, ...	Mary M'Colgan	Eskeheen, Muff.	2	0	0
Inch, ...	Geo. M'Intyre,	Inch.	2	0	0
Balleeghan. ...	Jas. M'Laughlin,	Moneyhaughley,, Manorcunningham.	2	0	0
Aughanunshin	William Orr,	Ardrawer, Letterkenny.	4	0	0
Gartan, ...	Samson Tease,	Gartan, Churchill.	2	2	0
Leck, ...	Edwd. M'Grath,	Oldtown, Letterkenny.	4	0	0
Kilmacrenan,	Wm. Frieze,	Kilmacrenan.	2	2	0
Killygarvan, ...	Patk. M'Bride,	Rathmullan.	2	2	0
Rathmullan Abbey, ...	Jas. Ewing,	Killygarvan, Rathmullan.	2	2	0
Meevagh, ...	Patk. Gallagher,	Clontallagh, Downings.	2	2	0
Ramelton ...	George Taylor	Ramelton,	2	2	0
Killydonnell Abbey, ...	Michl. Hannigan,	Kill Lane, Ramelton,	2	8	0
Ballindrait. ...	William Wilkie,	Bogagh, Ballindrait,	2	0	0
Clonleigh, ...	Patk. Friel,	Clonleigh, Lifford,	4	0	0
St. Johnston, ...	Thomas Magee,	St. Johnston,	1	0	0
Ballybogan, ...	Chas. Burns,	Ballybogan, Lifford,	1	0	0
Kilmacrenan ...	Manus O'Donnell	Kilmacrenan,	2	2	0
Cooley, ...	Michl. Bonner.	Cooley, Moville,	3	0	0
Raymoghey, ...	Hugh Roarty.	Ray, Manorcunningham,	1	0	0
Tully, ...	Chris Leavy,	Drummond, Ramelton,	4	0	0
Naran ...	Peter M'Loone,	Naran, Glenties,	3	0	0
X Clonmany, ...	Patk. Kelly,	Clonmany,		4	6

X Ex-Soldier's Grave.

SANITARY SUB-OFFICERS IN COUNTY DONEGAL.

Name of District.	Name of Officer.	Annual Salary.		
		£	s.	d.
BALLYSHANNON	Vacant.	25	0	0
DONEGAL	Joseph McCloskey	25	0	0
PETTIGO	John Travers	10	0	0
DUNFANAGHY	Joseph McIlwaine	15	0	0
DUNGLOE	James O'Donnell	10	0	0
GLENTIES	John P. Doherty	10	0	0
CARRICK	Maurice Byrne	10	0	0
CARNDONAGH	Mary Lynch	10	0	0
MOVILLE	P. V. McLaughlin	10	0	0
CLONMANY	William Grant	10	0	0
BUNCRANA	J. J. Doherty	26	0	0
AILEAGH	Charles McLaughlin	48	0	0
LETTERKENNY	N. S. Browne	32	0	0
MILFORD	Hugh McBride	10	0	0
RATHMULLAN	Dan Dunleavy	10	0	0
ROSGUILL	Dan McBride	5	0	0
CLOGHAN and STRANORLAR	Bernard Griffin	20	0	0
KILLYGORDON	Bernard Griffin	10	0	0
CASTLEFIN	Ernest Alexander	32	0	0
RAPHOE	James McGarron	24	0	0

PART II.

ANNUAL REPORT

OF THE

COUNTY MEDICAL OFFICER OF HEALTH

COUNTY DONEGAL,

ON THE

COUNTY SCHOOL MEDICAL SERVICE

YEAR 1940.

ANNUAL REPORT ON THE COUNTY SCHOOL MEDICAL SERVICE.

YEAR 1940.

Total number of Schools in the County ...	387	1937 figures
Total School Population	23,159	

The total number of children examined in 1940 was 5,106 as compared with 5,893 in 1939.

All children presenting themselves for examination were examined in each school visited. Out of a roll total of 11,409 we had therefore 5,106 examined, that is to say 44.7 per cent.—much the same figure as for previous years.

Attendance of Parents.

Sixty-six per cent. of parents attended personally at the school inspection. This is a well-marked increase on last year's figure of 50 per cent., and it is earnestly hoped that the attendance will be maintained at such a satisfactory figure.

Comments on tables of defects.

The figures for 1940 show a marked decrease from 13.7 per cent. to 9.1 per cent. for "cleanliness of body." The figures for "cleanliness of head" are exactly the same as last year, 12.9 per cent. As mentioned in last year's report, these euphemistic terms refer to louse infestation — of varying degree. The ease with which these parasites may spread even from a single source to a whole school has been previously remarked on. This is especially the case in small country schools, where it is not unusual to see all coats and other outdoor garments placed in a heap on the floor. Indeed there is often no other place for them.

The presence of such a degree of louse infestation is disquieting, in view of the ever-present possibility of another outbreak of typhus fever, which in its epidemic form is spread by lice—both varities, the head and the body louse being capable of transmitting the infection. Every effort is made to have the houses of these children visited by District Nurses, in the endeavour to inculcate some elementary hygienic principles.

INFESTATION WITH LICE.

From the start of the School Medical Service, pediculosis (lousiness) has received a good deal of attention in all countries, and marked diminution in its incidence has since been apparent, at least to outward seeming, in most countries.

Reference to last year's report shows that the figures for cleanliness of head and body—polite euphemisms for "lousiness" —were 12.9 and 13.7 per cent. respectively. It was pointed out that one infested child is capable of unconsciously transferring its unwelcome parasites to all the children in a school, thus nullifying to some extent, the efforts of many parents to keep their families free from these insect pests. Merely brushing lightly against an infested person is sufficient to ensure transfer of lice from one person to another. This is readily understandable by anybody who has seen the louse under the microscope, with its long curled, sharp talons, eminently fitted for grasping.

This question of louse infestation takes on a rather grim significance when we consider that the insect is the vector of Typhus fever, a dread disease, which made an unwelcome appearance in our country this year after a prolonged absence. It was distinctly fortunate, as pointed out elsewhere, that by the grace of God, the first cases of the disease were quickly diagnosed, and that they were confined to persons of the vagrant class, who keep largely to themselves.

The evacuation of school children in England as a result of war conditions gave rise to what amounted to a public outcry at the large number of lousy children who were sent to reception areas. This was all the more surprising when we consider the following facts. In 1915, for instance, 28 per cent. of the London school children were found to be lousy, but in 1923 the percentage had fallen to 18.1. The incidence fell steadily to 3 per cent. in 1934, and remained about this level until 1938. The Chief Medical Officer of the English Board of Education remarked in his 1928 report : "The most exacting, thankless, but none the less important duty of the school nurse is that in connection with personal cleanliness in school children. There is hardly any issue so primary and fundamental to the health of the child as that of cleanliness." In 1933 it was stated that the percentage of London children found free from even traces of nits or lice in the hair was 96.2.

As a result of the rather widespread occurrence of lice in evacuated children in September 1939, with consequent public indignation in reception areas, further inquiries were set on foot. Early in 1941 Dr. K. Mellanby published results of an investi-

gation carried out by him on patients admitted to Fever Hospitals, to the number of 60,000. He found a much higher incidence that the public had been led to believe. In ten industrial towns he ascertained that louse infestation among males rose from 11 per cent. at ages under 1 year to 44 per cent. at 2 years of age, and then gradually fell to 21 per cent. at 13 years ; in females it rose from 12.3 per cent. to 51 per cent. at 3 years, and fell only slightly to 45 per cent. at 13 years. Dr. Mellanby refused to consider the presence of nits as being less significant than of lice themselves, though his records separate the two conditions.

He concludes, therefore, that pediculosis is much more common throughout school and pre-school life than was generally believed. A relatively low rate was discovered in rural areas. He urges that school teachers should be induced to take a keener interest in the matter, and points out that the modern fashion of permanent hair-waving, which extends to quite young girls, is a distinct obstacle to cleanliness. Dr. Mellanby also emphasises the need for constant harping on the subject with the public, and for extended legal power to deal especially with children under school age.

If premilinary precautionary measures are not taken in this country, it is obvious that the public are in for a bad shock in our reception areas, if and when evacuation of our Irish school children takes place. The time is ripe for an onslaught on the reservoirs of infestation, namely the comparatively few dirty families who are responsible for keeping up the constant supply of parasites among their cleaner neighbours. A healthy public opinion on the subject would do much to eradicate the condition. Unfortunately there is a tendency to avoid all direct reference to the subject of lice except under direct necessity, and even then only furtively, and with great reluctance. Admittedly the subject is distasteful to most people, even though the biology of the louse with its historical implications in world affairs, is a most fascinating subject. A recent B.B.C. military commentator related that he went to look up the word "parachute" in the Enclyopaedia Britannica, but his eye was held by the word "parasite" first, and he spent as he termed it a thrilling if gruesome couple of hours reading of the enthralling exploits of our insect neighbours—to the entire exclusion of his original intention.

Simple life histories of our commoner parasites might well be incorporated in elementary school readers, and illustrated charts giving the salient points of such life-histories should be hung on the walls of the school. Talks on hygiene should also be a regular feature of school instruction. In this way public atten-

tion would be kept stimulated as to the importance of the subject, and some erroneous biological beliefs still current, would die a natural death as a result of a better-informed public opinion.

In last year's annual report some of the more important facts concerning the biology of the louse were set forth, together with measures for its control and eradication. The difficulty is of course, to persuade people to read these reports, and in any case, a wider public should be approached than is necessarily attainable by a formal annual report. It is hoped that the information contained therein may gradually permeate through the country, and give our people a saner outlook on what is often termed "an unsavoury subject."

It is time we faced up to the matter instead of burying our heads in the sand, ostrich-fashion, and hoping for the best. A policy of hush-hush is most fatal to any fundamental improvement in louse infestation, and must, therefore, be discarded. The more light is thrown on the subject, and the more it is discussed by the public in an enlightened and dispassionate manner the better for all concerned.

Reference to the section on Typhus fever in this report will serve to illustrate the dreadful consequences that may arise when louse infestation becomes common, as in war conditions, and is thus allowed free play in the transmission of infectious disease.

SCABIES. (ITCH).

This condition seems to be widely prevalent in some areas, so much so that it has apparently become chronically endemic. A fair proportion of children and adults attending at tuberculosis clinics are constantly found to suffer from this skin infection, and on inquiry from any one of these individuals it is soon obvious that the whole family is affected in practically every case. So widespread does the condition appear to be that it may be considered a public health problem of some magnitude. Unfortunately it is highly infectious, and for this reason spreads throughout a school population and thence to the general population in a short time. Hence it is considered advisable to give the following short summary of the origin and cause of this distressing malady.

Scabies is due to infestation of the superficial (horny) layer of the skin by a tiny mite called the "Acarus Scabiei," which is just barely visible as a little speck to the naked eye. The disease

is initiated when a freshly impregnated female gets on to the skin of its victim. She immediately burrows into the horny layer of the skin, travels along horizontally, depositing eggs and faeces in her track, and finally dies at the blind end of her burrow. The eggs hatch out in three or four days, and the larvae emerge on the skin. In about four weeks after the original deposition of the eggs, the adult stage is reached. These new generations mate, and the resulting fertilised females again burrow underneath the skin, giving rise to intense itching and irritation. This violent itching is purely nocturnal, because the itch mites are most active at night.

"The burrow may be likened to a mole-run in turf, i.e. although it has a roof over it, the surface is disturbed and the horny layer cracked, so that with the naked eye a fine fretted line can be seen, usually with irregular bends in it and varying in length from a quarter to half an inch." Careful examination with a hand-lens may reveal the acarus as wax-like speck at the extreme end of the minute burrow.

The usual sites of burrows are : the webs and sides of the fingers, the front of the wrists, the elbows, arm-folds, nipples, body generally, gluteal region, and soles and toes in young children. The face is often affected in infants up to one year, but not in older persons.

The usual treatment of this distressing malady by sulphur ointment does not seem to be efficacious, whatever the reason. Indeed it seems as if the greater majority of the sulphur applications in addition to causing an unpleasant and resistant skin irritation and rash, are very uncertain in their action.

For this reason, many efforts have been made of recent years to devise a satisfactory substitute, and an outstanding success has been achieved with Benzyl Benzoate lotion. Two treatments of the affected parts is usually sufficient. Twenty-four hours after the second application a bath is taken, and clean underclothing are put on. **The discarded underclothing and the bedclothes used by the patient should be sterlised by boiling.** Gloves must also be sterilised. It is essential that all the family be treated on the same days, even though they show no signs of the disease. Some proprietary non-irritant preparations of Benzyl Benzoate are now available to the medical profession. A note on the efficacy of this method of treatment was circulated to all medical practitioners in the county last year.

VISUAL DEFECTS.

The incidence of defective vision in 1940 was 811 cases out of a total of 5,106 children examined, i.e. 15.9 per cent. as compared with 16.8 per cent. last year. The following table shows the annual incidence since 1936 :—

YEAR	1936	1937	1938	1939	1940
Percentage of children with Defective Vision (Co. Donegal).	26.0	16.9	17.4	16.8	15.9

The following report was kindly supplied by Dr. G. O'Donnell, County Ophthalmic Surgeon :

"During the year 1940-41, I examined 767 children with defective vision. This number practically wipes off all the arrears, which had accumulated for the past few years. There were no cases of Trachoma amongst the children, (there were 4 cases amongst the adults). The attendances were very good ; the large majority of absentees being amongst the arrear cases (where the children had left the school, and the district)".

Eye Diseases encountered amongst children during 1940

Albinism	6.
Blepharitis ...	12.
Cataract (Congenital)	4.
Cataract (Traumatic)	1.
Choroiditis	2.
Chalazion	1.
Coloboma of Iris	1.
Corneal Ulcers (Phlyctenular)	8.
Catarrhal Conjunctivitis	1.
Cretinism with High Myopia	2.
Episcleritis	1.
Myopia (High)	28.
Nystagmus	16.
Defective Vision due to old injuries	3.
Ptosis (3rd. nerve)	1.
Retinal Detachment	1.
Strabismus	148.
Interstitial Keratitis	1.

TEETH.

PERCENTAGE OF CHILDREN WITH DENTAL CARIES.

(Marked Degree or for Treatment).

1931	1932	1933	1934	1935	1936	1937	1938	1939	1940
28.5	35.1	38.0	35.1	44.9	44.0	36.9	39.4	46.6	41.4

41.4 per cent. of children showed a well-marked degree of dental caries as compared with 46.6 in 1939. The following report was kindly supplied by Mr. J. R. Kelly, B.D.S., on the work done in the southern half of the county :—

Dental Report for the Year 1940.

"For the year 1940 eighteen Clinics were held in South West Donegal. There was a total attendance of 679 children or a little over 60 per cent. of those summoned. The attendance would have been better but in more than one case Clinics were called in districts where schools were closed owing to epidemics of Measles etc. Had we been notified the Clinics could have been postponed.

On the whole parents take more interest in the Dental Health of the children and are anxious for and willing to take advice on dental matters. The children too are more amenable to treatment. As in former years 90 per cent. of the extractions are temporary teeth which more or less indicates that the feeding in babyhood is faulty.

I have not the figures of previous years at hand but it seems to me that the numbers sent forward from the Medical Inspection are not as high as heretofore and the standard of dentition of those coming forward is somewhat improved."

(Signed) J. R. KELLY,
Donegal. March 1941.

The following report was kindly supplied by Mr. J. V. Callaghan, L.D.S., on the work done in the northern half of the county :—

Dental Report for 1940.

"I beg to report that the condition of the teeth of the children attending the various clinics in my area is distinctly bad, not alone is the percentage requiring treatment high, but some children require extensive treatment.

Extraction of temporary teeth shows a large increase, which goes to point out that the teeth of the youngest children are becoming worse, not better.

It is to be regretted that a large number of parents still refuse to have their children treated under the School Dental Scheme. This question of "Refusals" will have to be tackled sooner or later, and no time should be lost and no effort spared to obtain for these unfortunate children the dental treatment which is so essential to their future health.

(Signed) J. V. Callaghan,

School Dental Officer.

TUBERCULOSIS.

The cases with suspicious pulmonary symptoms have been already discussed in the general section of the annual report.

The number of new cases of suspected non-pulmonary disease was four, as compared with fourteen in 1939. The cases were classified as follows

Abdominal	3.
Bone (old healed sinus)	1.

Twelve cases of non-pulmonary tuberculosis were seen at the routine school inspections. These include the four new cases mentioned above.

Tuberculosis in Children.

Professor Bela Schick emphasises that the wall of the stomach and intestines may be permeated by the tubercle bacillus, particularly during the first year of life. Tuberculous infection is generally caused by inhalation of the germs into the lungs. Intestinal infection is usually caused by drinking raw milk containing the bovine type of bacillus. In the United States, where milk production is strictly supervised and where the milk is either pasteurised or not consumed raw the incidence of intestinal infection is negligible. The early signs of the disease do not appear before four to six weeks after the infection, frequently later.

The presence of a positive tuberculin test in infants and children up to five years of age has very great importance, and should be considered as a warning signal even if no other clinical symptoms are present. "The regular testing of children with tuberculin by the family physician is the ideal procedure to detect an accomplished infection with tubercle bacilli. This would be

desirable for every child." (Schick). It is certainly necessary in the families with a history of tuberculosis in the parents or other members of the family. "We must bear in mind, therefore, that without testing with tuberculin, and without a roentgen examination no physician is able to rule out the presence of tuberculosis in a child." The child may even look the picture of health.

What are the symptoms that should give rise to suspicion that a child has tuberculosis before a thorough examination is made ? The poison of the tuberculous infection leads to a loss of appetite, pallor, less interest in play and a tired feeling. Cough is sometimes present, but is often not a prominent feature. Many cases show either no rise in temperature or only an occasional rise, which may easily be overlooked. If such general symptoms are present the tuberculin test must be applied. The usual methods of examination will frequently not show definite changes. In many cases however, x-ray examination will show a definite lesion. Even though the x-ray examination reveals no definite disease, a positive tuberculin test, together with the above-mentioned symptoms, justifies the conclusion that the child is affected by tuberculosis, particularly if not more than four years of age.

Other clinical manifestations are, especially in infancy and in the second year of life, the presence of tuberculids or other signs of tuberculosis of the skin. These tuberculids may be diagnosed as chickenpox. "They are small in size (linseed) resembling pimples, brownish red, round, showing a necrotic centre. This centre may have fallen off, in which case we find a very small hole. Such children are in danger of developing miliary tuberculosis and tuberculous meningitis."

The second important clinical sign of tuberculosis is the presence of a phlyctenula (little ulcer) at or in the cornea of the eye.

The third sign which should arouse suspicion in the mind of the physician is the appearance of "erythema nodosum." Wallgren in Sweden described erythema nodosum as an early manifestation of tuberculosis. For practical purposes erythema nodosum should be regarded as a sign of the presence of tuberculosis unless a negative tuberculin test should prove it to be one of the rare non tubercular forms.

Schick agrees with Wallgren that erythema nodosum is a fairly early symptom of infection with tuberculosis. The tuberculin reaction is frequently strong, and x-ray examination may show mischief in the lung, though ordinary methods of examination reveal nothing (i.e. percussion and auscultation).

The fourth sign which is very important is the "expiratory dyspnoea" frequently combined with a peculiar kind of dry cough — high pitched, brassy ; in other cases resembling whooping-cough, but as a rule without whoop and without vomiting. This syndrome is rather restricted to infancy and up to eighteen months of age. The diagnosus from asthma may be made by the tuberculin test and x-ray examination.

A fifth characteristic sign is enlarged glands in the neck. Whether they are tuberculous in nature should be determined by the tuberculin test.

A sixth sign pointing to tuberculosis is the appearance of fluid in the pleura or in the abdomen. The appearance of pleurisy with serous fluid is, in practically all cases due to tuberculosis. Testing with tuberculin will prove the tuberculous nature of the pleurisy. As a rule, tuberculous pleurisy is a benign form of tuberculosis.

The various forms of tubercular bone and joint disease are only too familiar in countries where raw milk is consumed. Swelling of the testicles is a not rare manifestation of tuberculous disease.

The well-known and severe forms of generalised tuberculosis known as miliary tuberculosis and tuberculous meningitis account for the vast majority of fatalities from the disease in childhood.

The infant or the child in the second year of life is especially endangered by this rapid and massive spread of the disease. It is worth noting that the first stage of meningitis is frequently mistaken for a gastro-intestinal upset. The later stages may be wrongly diagnosed during a poliomyelitis or encephalitis epidemic.

"Next to the roengen examination, testing with tuberculin is one of the most important aids for establishing the diagnosis" (Schick). The Vollmer "patch test" is very easy, and has been found quite reliable.

"The positive tuberculin test proves the existence of a tuberculous focus in the body, but not necessarily an active process. In infants and children up to three and four years of age the positive test can be taken as a sign of a relatively active process, because the tuberculous infection needs at least two to four years before it is arrested. The older the child, the less we can rely on the positive test as a sign of an active tuberculosis. Beyond 7 to 8 years many children (25-40 per cent.) show a positive test. The decision whether an active process is present must be based on further clinical and x-ray evidence. In this age period the

negative test has more weight for diagnosis. (It may, of course, be negative in advanced tuberculosis, when the diagnosis is not in doubt)".

It may be mentioned that the province of Liege in Belgium had set up in 1939 a travelling radiological clinic to examine school-children. A doctor and a nurse toured the communes in a specially fitted-up motor car in order to carry out the tuberculin skin-test and radioscopic or radiographic examination on school-children. These examinations revealed numerous defects of health, quite apart from pulmonary tuberculosis.

HEART DISEASE.

Eight children were found to show abnormal heart conditions. Five cases of (mitral) valvular disease were investigated and there was a definite history of Rheumatic Fever in three of these. There was nothing in the history of the other two to account for the heart lesion. Two further cases were considered to be probably of congenital origin. One of them, a girl of 6 years, had no symptoms referable to the heart, and looked quite healthy. She was found to have tachycardia with irregularly-occurring extra systoles. The other, a girl of ten years had a rather high colour and was subject to fainting-fits. She had a well-marked mitral systolic murmur. The eighth child, a boy of seven years, had no symptoms. Examination of the heart showed an extra systole occurring fairly regularly once in about every twelve beats. He is being kept under observation.

Of the eight cases, four were females and four males. Their ages ranged from $5\frac{3}{4}$ years to $13\frac{1}{2}$, as indicated in the following table :—

Females	$5\frac{3}{4}$	$6\frac{1}{2}$	$9\frac{3}{4}$	$12\frac{3}{4}$	years
Males	7	$7\frac{1}{2}$	12	$13\frac{1}{2}$	Years

The three cases with a history of Rheumatic Fever may be summarised as follows :—

1. E.D., male, $7\frac{1}{2}$ years had Rheumatic Fever in December 1939. He was in hospital for two months with cardiac complications. He was examined in school on 1/7/1940.

2. L. McK., male, 11 years had Rheumatic Fever in March 1940. His knees were swollen and painful at that time. When examined at school on 20/9/1940 he had a definite valvular murmur. He was also noted to have very large tonsils.

3. B. C. McG., female, 6 four-twelfth years had Rheumatic Fever in February 1940, with pains in all her joints. She was in bed for three weeks. School examination, 15/4/1940, revealed a well-marked valvular murmur in the mitral area.

IMMUNISATION AGAINST DIPHTHERIA, 1940.

(COUNTY DONEGAL).

NAME OF DISPENSARY DISTRICT.	NUMBER IMMUNISED.
Carrick	900
Cross Roads (Bunbeg)	797
Dunfanaghy	591
Churchill	192
TOTAL, ...	2,480

The following table shows the total numbers of children immunised against diphtheria in the years 1935 - 1940 :

YEAR.	NUMBER IMMUNISED.
1935	2,810
1936	—
1937	4,528
1938	3,425
1939	1,186
1940	2,480

As noted under Infectious Diseases in the general section, out of a total of 29 cases of diphtheria notified in 1940, only three had been immunised, and none of these died. It may be deduced, therefore, that even if immunisation does not protect against contraction of the disease in every case, it appears to be of distinct benefit when an immunised person is actually infected—which does not seem to be very frequent.

In this connection it is interesting to note that A. Christie recently reported a follow-up study of children to test the duration of immunity. According to the type of material used, doses given, and periods between injections and the test, 77 to 95 per cent. of the group showed that they had become immune in four to twelve weeks (as demonstrated by the Schick skin test). After

a four to nine years' follow-up period, 46 to 88 per cent. of the known immunes were still found to be immune, and 12 to 54 per cent. had lost their immunity. Christie concludes that all children immunised in the first year of life should be Schick-tested again on admission to school, when those who are positive (i.e. susceptible to the disease) should be given a stimulating dose of toxoid.

SCHOOL MEALS.

During the year 1940, a sum of £3,363 4s. 11d. was paid by the Board of Health for meals supplied to children attending National Schools in the scheduled area under the School Meals (Gaeltacht) Act, 1930. A further sum of £57 9s. 10d. was paid for administration expenses. The scheme was operated in 114 schools.

Bundoran.

From 7th November 1939 to 31st March 1940. Average daily attendance 24.2. 91 school days in period. Committee :— 3 members St. V. de Paul and Parish Priest. Food same as previous year.

Ballyshannon.

The Scheme is in operation in the Convent Schools and in the De la Salle Brothers' (St. Joseph's) Schools throughout the entire year, and the average number of necessitous children in receipt of meals is forty-five.

The food supplied is 4 ozs. bread and margarine and half a pint of pure new milk to each recipient. Pure milk is now supplied in preference to cocoa which had been provided for the first few years during which the scheme was in operation. The milk is heated except during the warmer months.

The meals are prepared and distributed in the Convent Schools by the Sisters of Mercy, and in the Boys' School by the local troop of Catholic Boy Scouts under the supervision of the Principal Teacher. An oil cooker was supplied for cooking purposes in the Brothers' School ; in the Convent they had already a coal range in their cookery room. Utensils, etc., were provided in both schools.

8,966 meals were supplied during the financial year ended 31st March 1941, at a total cost of £44 3s. 4d. The average cost per meal was 1.1822 pence.

For financial year 1941/1942, the Scheme is being extended to include Carrickboy Girl's N.S.

Letterkenny.

No particulars have been received regarding the operation of the School Meals' Scheme in this Urban District for the year 1940.

RURAL DIETARIES. (L. of N. Quart. Bulletine, 1939).

The chief characteristic of rural dietaries is monotony, since the average peasant household uses only a limited number of foodstuffs. This is a disadvantage from the nutritional point of view since, in a more varied diet, there is less danger of shortage of one or more essential food factors, particularly certain minerals and vitamins. There may be considerable seasonal variation in rural dietaries, but the day-to-day dietary, during the greater part of the year, usually lacks variety.

The first requirement of the average European peasant is to produce, with the greatest economy of land and of labour, foodstuffs which will supply the maximum energy value which he needs for hard physical work. For this reason cereals, which are the cheapest form of energy-providing foodstuffs to produce, form the basis of most peasant dietaries. The type of cereal used varies, but whether the cereal grown (or bought) is wheat, rye, barley, oats or maize, it is used in the great majority of peasant households throughout Europe as the basis of every meal.

The preponderance of cereals in the rural dietary is most marked in Central, Eastern and South-Eastern Europe, where cereal foods often provide 80 per cent or 90 per cent. of the energy value of the diet. This very high proportion of cereals in the diet decreases as the peasant population becomes more prosperous, and is very much less in Western or Northern Europe. In the more primitive rural areas of Europe, cereals are not always eaten as bread, but are often simply ground to a rough meal and cooked with water as groats, porridge or polenta, or made into hard, unleavened cakes.

After cereals, some vegetable of high energy-providing value is usually the second most important foodstuffs. In Ireland, in Poland and in parts of Germany, potatoes are even more important than cereals in providing the energy value of the diet. In most parts of the Balkans and Central Europe, beans are second only to cereals as a regular source of calories in the rural dietary.

The amount of meat eaten by rural populations varies greatly from one region to another. On the whole, the consumption of meat depends on the prosperity of the peasant.

The level of milk consumption in rural households does not depend entirely on the level of milk production in that area. The tendency is for peasants who produce milk, eggs, butter or cheese, to regard these products primarily as articles for the market, and not as essential foodstuffs for their own families. A striking example was the Danish farmer who produced butter for export and bought margarine for himself and his family.

It is usualy economic necessity rather than ignorance that prevents the peasant from consuming an abundant amount of the meat, eggs, milk and vegetables which he produces These foods are often regarded as luxuries, and if a peasant family becomes prosperous, it will eat more meat and more eggs (and perhaps more milk, though in many parts of Europe, milk is not considered as a normal food for adults). But, to a certain extent, ignorance is also involved ; such valuable foods as whey and blood are wasted in some countries and consumed in others.

The rural dietary is usually at its best in late summer and autumn when fruits are available and the supply of cereals, vegetables, eggs and milk products is most abundant. In the spring the opposite is true, and in the poorer rural communities in Central and Southern-eastern Europe the diet may become drastically reduced as the supply of cereals meat and vegetables runs out. It is at this season of the year that most ill health due to the deficient diet is seen, in the form of pellagra, scurvy, night blindness, rickets, and the other deficiency diseases.

The difference between refined (white) flour and wholemeal flour (whether of wheat, rye or barley) is undoubtedly of considerable nutritional significance, especially in the case of the Central and South-east European peasants for whom bread (or other cereal food) forms the basis of the diet. Whole-grain wheat or rye flour provides at least twice as much minerals and vitamins as refined white flour, and these are the very factors in which most peasant diets are deficient. The loss of these essential substances during milling is less important in the case of abundant and varied dietaries, but it would certainly be of grave significance in the more restricted rural diets.

Probably the worst feature of rural nutrition is the feeding of infants and young children, and of pregnant and nursing mothers. Infants are usually fed at the breast in rural areas for a longer period than in the towns, but, in spite of this, rickets is found to be very widespread in most rural regions, whether in the Balkans, Central Europe, Scandinavia or Western Europe. This paradox seems to be due to deficiencies in the mother's diet, which is too poor to enable her to provide the child with sufficient

minerals and vitamins. This may often be due to ignorance of the nutritional needs of pregnancy and lactation, so that even when milk, eggs, meat and vegetables are available, the mother does not know how important it is that she should have a more abundant share of these foods than usual. Amongst the slightly older children also, wrong feeding is probably more common in the country districts than in the towns, due to greater ignorance, as well as to lower purchasing power.

METHODS OF IMPROVING RURAL DIETARIES.

There is no doubt that the nutritive value of rural dietaries could often be improved by education. The majority of rural housewives in Europe know little or nothing of the principles of nutrition, and they might frequently be able to feed their families more adequately if they knew the relative value of different foodstuffs. The importance attached to certain foods varies considerably in different countres. For instance, in Scandinavia, Finland and Latvia milk is known to be a valuable food and is drunk by old and young ; but in Greece and many parts of the Balkans milk is not regarded as a food for adults and is only given to very young children and invalids. Again, the Roumanian peasants do not usually bother to grow vegetables for their own use, while, in the same regions, Bulgarian peasants will cultivate and consume a variety of vegetables and thereby escape the pellagra from which their Roumanian neighbours suffer.

Through ignorance, there is often a serious wastage of potential foodstuffs in rural communities. For instance, in cheese-making districts in Britain, the whey, if not required for pig-feeding, is often thrown away, while in some countries the peasants take home whey from the village dairies to use for cooking purposes, thus adding valuable minerals to their diet. In Hungary, the village abattoirs throw away the blood after slaughtering, whereas in parts of Czecho-Slovakia blood is made into sausages or consumed as blood soup. By education, such wastage of valuable foodstuffs could be prevented.

The consumption of fruits and vegetables could probably be increased considerably in most countries (with very great advantage to the nutritional value of the diet) by education in methods of growing and preserving them. Many rural communities have abundant supplies of fruit and vegetables at their disposal for a short season, and having no knowledge of how to preserve them for winter use, they leave much of the crop to waste. For instance, in Latvia, the teaching of methods of preserving fruit and vegetables has enriched the winter dietary in many farm households, and, in Bulgaria, the Ministry of Agriculture has

started a campaign for demonstrating in the villages very cheap methods of canning surplus fruit and vegetables for home consumption in winter. Education in the feeding of infants and growing children would also be of immense value in most villages of Europe, for it is here that ignorance is the greatest danger to health.

Many European countries have realised the urgent need for education with regard to rural nutrition, and a beginning has been made to instruct the rural housewife as to the dietary needs of her family, even in several of the relatively backward agricultural countries.

Apart from any improvement in the peasant dietaries which can be achieved by greater knowledge, there are whole areas in Europe where the peasants have not sufficient land to produce either all the foods their families ought to have or sufficient of a cash crop to enable them to buy an adequate diet. In such cases, some sort of planned assistance from the State is necessary if the nutrition of the peasants is to be made adequate for health. There are, for instance, parts of Yugoslavia and Sub-Carpathian Russia to which wagon-loads of cereals have to be brought each year to feed the population, and paid work has to be provided in the form of road-making or some such State undertaking.

The methods used to help the peasant must depend on the individual State. In some cases, agricultural credit is given to enable the farmer to buy equipment to increase production ; in other cases, the agricultural producer may get relief from taxes, direct subsidies, family allowances, or free seed or stock from the State.

Relief is often given to destitute families in rural areas in the form of food, and many countries provide village children with free or cheap meals at school. But these relief measures only touch the fringe of the problem and offer no real solution. This can only be found in agricultural and economy readjustments, both national and international. This aspect of the problem of nutrition is very complex and has been dealt with elsewhere, as, for instance, in the Final Report of the Mixed Committee on Nutrition in 1937, which considered nutrition in relation to agriculture and economic policy.

BREAD.

The increase in the consumption of sugar at the expense of bread is to be deplored from the nutritional point of view. Sugar contributes no proteins, vitamins or minerals to the diet, while bread, even when it is white bread, supplies small, but by no

means negligible amounts of certain vitamins and minerals, as well as considerable amounts of protein. Indeed in the poorer families of the industrialised countries of Europe, bread may become a very important provider of proteins. For example, in England, the amount of protein provided by the bread and flour is about 20 grammes a day, which is one-third of the total amount of protein eaten by the poorest 10 per cent. of the population.

The extent to which the composition of the bread will affect the nutritional value of the diet of a nation depends naturally on the composition of the rest of the diet. If the other foodstuffs in the diet provide sufficient proteins, minerals and vitamins for optimal health, then it does not matter whether or not the bread, which supplies part of the energy value of the diet, contributes vitamins and minerals. In other words, in the ideal diet, it does not matter whether the bread is made of white or brown flour. But, unfortunately, the diets of large sections of population in all parts of Europe are frequently found on analysis to contain less than an optimal amount of one or more food factors, usually a shortage of minerals and of vitamins. In this case, it is obviously of considerable importance whether the bread eaten contributes appreciable amounts of vitamin B_1 and iron or whether it is devoid of these factors.

The principal question with regard to the nutritive value of the bread commonly eaten by a nation, a family or an individual is : Does it contain sufficient vitamin B_1 and iron to ensure that the total diet provides an optimal supply of these two factors ? Other deficiencies in the diet must be made up by other foodstuffs, but the vitamin B_1 content of most foodstuffs is not very high, so that it is very difficult to select a diet of average cost which provides an optimal amount of this vitamin if the bread and flour eaten are devoid of it. The requirement for vitamin B_1 has been shown to increase with increase in carbonydrate intake, and while the whole grain cereals provide more than enough to cover the extra demand made by the carbonydrate they contain, highly refined flours increase the need for vitamin B_1 without supplying any of it. In other words, whole grain cereals and unrefined brown flours give a credit balance of vitamin B_1 while refined white flours give a debit balance.

In certain parts of Hungary, it is the custom to add 20—25% of boiled potatoes to the flour. This makes a good tasting bread which keeps moist longer than pure wheat bread, and although it reduces the calorie and protein nitrogen content of the bread, it is considered by some authorities to be an advantage as regards mineral, vitamin and essential amino-acid content.

SCHOOL BUILDINGS.

Of the 202 schools examined during the year, the following 82 were adversely reported on :

ARDFARNA (BALLYSHANNON).
No Cloakroom.

AN CAISEAL (CARRICK).
See 1938 Report. The School is draughty, in bad repair, overcrowded. The playground is unsuitable and unenclosed.

ALTAGHADERRY (KILLEA).
Playground too small. Two teachers in one room — should be partitioned.

ACRES (DUNGLOE — BURTONPORT).
No drinking water convenient.

ANNAGRY (DUNGLOE — BURTONPORT).
The school is overcrowded. An additional classroom is required.

ARRANMORE No. 1. (DUNGLOE).
Sanitary accommodation inadequate.

ARDARA (4) (ARDARA).
Recommend extension of town water supply to school. The southern and eastern walls of the school are very damp.

ARRANMORE No. 2. (DUNGLOE).
School premises would require to be enclosed by a wall.

BALLYMAGROARTY (BALLINTRA).
Playground space inadequate.

BUNDORAN BOYS' (BALLYSHANNON).
Sanitary accommodation not in good condition.

BIRDSTOWN (KILDERRY).
Sanitary accommodation defective. Lighting defective owing to trees around school.

BELCRUIT (DUNGLOE — BURTONPORT).
Playground requires to be enlarged.

BREDAGH GLEN (MOVILLE).
The water-supply is bad — the only supply near is really a drain. Gallery in infants' room should be removed.

CARRICKNAHORNA No. 1. (BALLINTRA).
No cloakroom.

CREEVY (BALLYSHANNON).

Contract has been placed for a new School.

CASHELARD (BALLYSHANNON).

No water-supply for drinking convenient.

CARRIGANS (KILLEA).

No cloakroom. Practically no playground.

CLARE (MOVILLE).

Lighting defective.

CRONAGHBOIS (ARDARA).

See 1938 Report. Roof and floor in disrepair, walls damp, lighting bad, ventilation unsuitable, bad "blow-down" chimneys, windows unsuitable. A new school is a necessity.

CARROWKEEL (MOVILLE).

Only one room for two teachers. Recommend erection of partition.

CARROWNAGANONAGH (KILMACRENAN AND MILFORD).

Playground inadequate.

CLOGHER (GLENTIES).

Building very old, badly ventilated, and dark. Heating arrangements unsuitable. Sanitary accommodation defective. A new school is required.

CASHEL No. 2. (FANAD).

Playground rather small.

CROSS ROADS (KILLEA).

Cloakroom and playground rather small.

CARRICK (CARRICK).

Sanitary accommodation inadequate. Recommend installation of new closets.

DERRYBEG GIRLS' (CROSS ROADS—BUNBEG).

No convenient water-supply for drinking.

DUNGLOE (DUNGLOE).

School overcrowded — additional classroom urgently required. Playground needs enlargement. Water-supply should be laid on from town supply.

DOOBLN (GLENTIES).

The school is a wooden structure. No cloakroom. Playground too small and unenclosed.

FAHAN (or Gort) (KILDERRY).

Recommend new sanitary accommodation.

GLENMAQUIN No. 2. (MANORCUNNINGHAM).

No playground.

GLENAMQUIN No. 1. (MANORCUNNINGHAM).

No cloakroom or playground. No convenient water-supply for drinking. Window-sashes not fitting properly. Ceiling defective.

GLENCOLUMBKILLE (CARRICK).

The room is badly lighted. No cloakroom.

GORTACART (ARDARA).

Both teachers work in one small, overcrowded room. An additional classroom is required.

GOOREY (MALIN).

Ventilation unsuitable.

GLENTIES (B.) (GLENTIES).

Both teachers work in one room. Erection of glass partition recommended.

GRAFFY (GLENTIES).

Building very old. Badly ventilated. No playground. No closets. A new school required.

GLENDOAN (LETTERKENNY).

Playground too small.

GLENCAR (LETTERKENNY).

Ventilation unsatisfactory.

INNISKEERAGH IS. (BURTONPORT).

No drinking water convenient.

INCH ISLAND (KILDERRY).

This school has been condemned for years but owing to war nothing can be done at moment. The Manager intends building sometime.

KILMACRENNAN No. 1. (KILMACRENNAN AND MILFORD).
Door missing from boys' closet. Lighting defective, owing to trees. No cloakroom.

KERRYKEEL (FANAD).
This school has been condemned. Site is purchased but matters are at a standstill. Very urgent that this school should be built at once, as it is a most unhealthy school.

KNOCKLETRAGH (GLENTIES).
Building old and damp. No playground or cloakroom.

LAGHEY (LAGHEY).
Both teachers work in one room. A partition required.

LAGHEY BAR (LAGHEY).
New school under construction.

LUNNIAGH (CROSS ROADS — BUNBEG).
Site obtained for new school, but probably delay of building owing to war.

LOUGHILL (BALLYSHANNON).
School overcrowded. Badly ventilated and lighted. No cloakroom or playground. New school recommended.

LURGAN BOYCE (RATHMULLAN).
Only one room and two teachers. Recommend that partition be erected to provide separate rooms.

LOUGHANURE (DUNGLOE — BURTONPORT).
No drinking water convenient.

LETTERLEAGUE (LETTERKENNY).
Lighting defective. No cloakroom. Department has set aside some money to extend, so as to have two rooms.

MEENACLADDY (CROSS ROADS — BUNBEG).
Another room required as school is overcrowded.

MILFORD MIXED (KILMACRENAN AND MILFORD).
Lighting not so good in Infants' room.

MILFORD R. C. (KILMACRENAN AND MILFORD).
Playground rather small.

MONREAGH (KILLEA).
Windows placed too high in main room. Practically no playground.

MALINMORE (CARRICK).

No water-supply for drinking convenient.

MALINBEG (CARRICK).

No water-supply for drinking convenient.

MEENACROSS (CARRICK).

No water - supply for drinking convenient. The windows are in need of repair. South-west wall is very damp and in need of repair.

MEENBANAD (DUNGLOE — BURTONPORT).

No source of suitable drinking water convenient to school.

MEENALECK (DUNGLOE — BURTONPORT).

The building is entirely unsuitable walls damp, floor defective, windows small and in disrepair. No closets. No playground. An new school is an urgent necessity.

MEENTINADEA (ARDARA).

Playground is inclined to be waterlogged in wet weather.

MEENMORE (DUNGLOE).

No drinking water convenient to school. Whole surrounding district badly off for water.

MEENATOTTEN (DUNGLOE).

The schoolroom is overcrowded. Would require to be enlarged and partitioned.

MEENACROSS (DUNGLOE).

Playground unsuitable and inadequate. No water supply convenient.

MANORVAUGHAN (CARRIGART — ROSGUILL).

Lighting inadequate, due to surrounding trees.

MALIN HEAD (MALIN).

Sanitary accommodation defective. Lighting in Infant's school-room defective — one of the two windows nailed up.

PORTLEAN (KILMACRENAN AND MILFORD).

Lighting defective.

RANAFAST (DUNGLOE — BURTONPORT).

The school is badly overcrowded. Extension needed urgently.

ROSLINE (DUNGLOE No. 1.).

The present premises are entirely unsuitable as school. The house is a rented cottage used in place of the old school which has collapsed since last School Medical Inspection. A new school is an urgent necessity.

RUTLAND IS. (DUNGLOE — BURTONPORT).
No playground.

RAY (MANORCUNNINGHAM).
No playground. Well would require to be procured for school purposes. Spring convenient and could be easily made available.

SLIEVE LEAGUE (CARRICK).
Premises definitely unsuitable See 1938 Report. Conditions have not improved since.

ST. BRIGID'S, COOLEY (MOVILLE).
Fire smokes in Infant's room.

ST. PATRICK'S, CARROWMENA (MOVILLE).
Playground inadequate and unsuitable.

SHROVE (MOVILLE).
No playground. Drinking water-supply from a condemned well, 200 yards distance.

TULLYMORE (BALLYSHANNON).
The building is antiquated and in disrepair. Contract placed for new school.

TURE (KILDERRY).
End-gable in Senior room damp. Ceiling and plaster falling down. Requires immediate attention.

THORR (CROSS ROADS — BUNBEG).
Playground unsuitable.

TERMON (KILMACRENAN AND MILFORD).
Lighting defective in Infant's room. Heating inadequate.

TRAIGHENA (DUNGLOE No. 1.).
The plaster on the ceilings is in danger of falling in many parts and should be repaired immediately.

TAMNEY (ROB.), (FANAD).
No cloakroom or playground. Ventilation bad.

TEELIN (CARRICK).
No drinking water convenient.

WHITECASTLE (MOVILLE).
No playground.

SUMMARY OF INSPECTION AND DEFECTS.

TABLE A.

Showing total number of children inspected during the year 1940, grouped according to Dispensary Districts, and the attendances of parents at the actual inspections.

DISPENSARY DISTRICT.	Number on Roll	Actual No. Inspected.	First Inspection	Second Inspection	No. whose Parents Present
ARDARA	531	277	94	183	227
An Breacaigh (Ardara) ...	52	33	15	18	32
Ardara Mixed (Woodhill) ...	17	7	1	6	7
Ardara (4) ...	98	30	18	12	21
Beagh ...	20	16	5	11	9
Cronaghbois ...	39	25	5	20	20
Garrowart ...	10	—	—	—	—
Gortnacart ...	50	27	17	10	24
Kiltoorish (Rosbeg) ...	19	18	5	13	10
Largynaseragh ...	23	17	3	14	15
Loughros Point (Drimitten) ...	20	15	2	13	12
Meentinadea ...	37	19	7	12	15
Meenavally ...	49	1	—	1	—
Narin ...	13	6	2	4	2
Sgoil Dhallain Forgaill, Portnoo,	53	47	8	39	44
Sgoil Leac Conaill ...	31	16	6	10	16
BALLINTRA. ...	130	53	34	19	28
Ballymagroarty ...	42	17	10	7	13
Carricknahorna (1) ...	13	2	2	—	2
Carricknahorna (2) ...	21	9	7	2	1
Cavangarden ...	20	13	8	5	11
Derries ...	16	3	3	—	1
Rossnowlagh ...	18	9	4	5	—
BALLYSHANNON.	1138	616	273	343	404
Ardfarna ...	58	39	12	27	21
Ballyshannon Convent ...	271	119	68	51	90
Behey ...	45	24	3	21	22
Bundoran Boys' ...	56	33	11	22	11
Bundoran Convent ...	176	92	53	39	75
Carrickboy Girls' ...	65	24	19	5	23
Cashelard ...	23	18	3	15	16

TABLE A.—Continued

DISPENSARY DISTRICT.	Number on Roll.	Total No. Inspected.	First Inspection	Second Inspection	No whose Parents Present.
Coolmore ...	45	23	9	14	17
Creevy ...	55	36	8	28	10
Finner ...	17	13	4	9	2
Kilbarron (Church Avenue) ...	41	24	7	17	18
Loughill ...	37	17	6	11	15
Naomh Sheosaimh (Ballyshannon)	181	106	54	52	43
Rockfield ...	38	36	10	26	32
Tullymore ...	30	12	6	6	9
CARNDONAGH.	671	157	50	107	80
Gleann Daoiligh (Gleneely) ...	13	1	—	1	—
Glentogher Convent, Carndonagh,	77	33	7	26	7
Naomh Columchille, Carndonagh,	70	24	8	16	17
Naomh Brighde, Carndonagh, ...	103	10	3	7	2
Scoil Padraigh Naomhtha, Carndonagh ...	175	52	20	32	40
Sgoil Padraigh, An Ceathramha Mor, ...	49	14	5	9	9
Sgoil Muire, Gleann Dhaoiligh,	75	13	4	9	1
St. Patrick's Boys, Carndonagh,	109	10	3	7	4
CARRICK.	737	390	151	239	343
Carrick ...	89	75	16	59	66
Coguish, Kilcar, ...	77	38	23	15	32
Grove, Kilcar, ...	25	10	8	2	8
Derrylaghan, Kilcar, ...	51	15	7	8	15
Glencolumbkille ...	6	—	—	—	—
Kilcar ...	56	27	21	6	22
Loughcraherk ...	31	14	6	8	14
Malinmore ...	22	8	5	3	8
Malinbeg ...	20	12	2	10	9
Meenacross ...	52	17	3	14	15
Meenaneary, Carrick, ...	66	50	15	35	50
Sgoil an Chaisil, Glencolumb-kille, ...	111	60	11	49	43
Slieve League ...	20	10	6	4	10
Straleel ...	31	4	4	—	4
Teelin ...	80	50	24	26	47

TABLE A.—Continued.

DISPENSARY DISTRICT.	Number on Roll.	Total No Inspected.	First Inspection.	Second Inspection	No where Parents Present.
CROSS ROADS (2) (Bunbeg)	992	355	161	194	240
Bun an Inbhir, Derrybeg, ...	97	32	14	18	12
Dunlewey ...	82	49	34	15	40
Knockastolar ...	180	84	40	44	78
Lunniagh ...	134	40	16	24	28
Meenacladdy ...	117	11	5	6	3
Scoil Mhuire (B.) Derrybeg ...	87	41	22	19	30
Scoil Mhuire (C.) Derrybeg ...	96	32	10	22	12
Scoil Columcille, Cnoc Fola ...	80	19	9	10	4
Scoil Padraig, (Dore) Gweedore...	80	21	4	17	16
Thorr ...	39	26	7	19	17
DUNGLOE NO. 1.	543	355	196	159	304
Crohey ...	21	18	13	5	15
Meenacross ...	79	46	24	22	40
Meenatotten ...	66	42	28	14	27
Meenmore ...	63	38	22	16	30
Scoil an Clochain Leith ...	182	123	71	52	121
Scoil Min na Manrach ...	54	54	23	11	31
Traighenna, Lettermacaward ...	39	28	9	19	20
Inishfree, Burtonport ...	12	12	2	10	12
Roshine ...	27	14	4	10	8
DUNGLOE NO. 2. (Burtonport)	934	713	375	338	662
Acres ...	33	26	12	14	21
Annagry ...	114	107	63	44	103
Belcruit ...	61	58	22	36	51
Burtonport Boys' ...	26	26	14	12	26
Carrickfin Island ...	13	13	3	10	13
Cruit Island ...	34	16	2	14	10
Keadue ...	78	56	31	25	56
Loughanure ...	116	77	48	29	62
Mullaghduff ...	97	99	45	54	96
Meenaleck ...	44	17	11	6	17
Meenbanad ...	106	81	47	34	76
Owey Island, Kincasslagh ...	18	18	10	8	18
Ranafast ...	111	66	44	22	62
Rutland Island ...	11	14	3	11	14
Sgoil Ard Croine ...	69	39	20	19	37

TABLE A.—Continued.

DISPENSARY DISTRICT.	Number on Roll.	Total No. Inspected.	First Inspection.	Second Inspection	No. whose Parents Present.
DUNGLOE NO 3.	320	214	80	134	203
Arranmore No. 1. ...	170	110	39	71	99
Arranmore No. 2. ...	126	75	30	45	75
Inniskeeragh Island ...	24	29	11	18	29
FANAD	646	208	83	125	57
Ballymichael ...	39	12	5	7	2
Cashel No. 2 ...	124	41	11	30	3
Croaghross ...	67	9	9	—	—
Drumfad ...	28	11	7	4	—
Sgoil Fanad ...	21	2	1	1	1
Kerrykeel ...	86	26	8	18	9
Leatbeg ...	14	8	3	5	7
Naomh Brighde, Ballylar ...	46	16	10	6	6
Sgoil Padraig Naomhtha Drumhach Bheag ...	36	16	10	6	6
St. Davadogg's, Tamney ...	86	33	6	27	10
Tamney Robertson ...	35	7	3	4	6
St. Columba's, Ballyheerin, Fannett ...	57	21	4	17	2
Ballyheerin Coast and Island N.S. ...	7	6	6	—	5
GLENTIES	361	187	69	118	142
Clogher ...	36	22	8	14	22
Croaghs ...	14	9	4	5	9
Doobin ...	18	5	3	2	—
Derryloughin ...	32	19	6	13	15
Edeninfagh ...	45	21	5	16	21
Graffy ...	40	34	7	27	24
Knockletragh ...	11	6	2	4	4
Mullanmore	31	8	3	5	8
Sgoil Dhruim na Croise ...	31	15	3	12	8
Scoil Chill Choinnigh ...	48	18	13	5	9
St. Connell's Boys ...	55	30	15	15	22

TABLE A.—Continued.

DISPENSARY DISTRICT.	Number on Roll.	Total No. Inspected.	First Inspection.	Second Inspection.	No. whose Parents Present.
KILDERRY	408	160	80	80	73
Birdstown ...	63	30	11	19	8
Carnamoyle ...	64	19	12	7	9
Fahan or Gort ...	19	4	3	1	1
Inch Island ...	60	14	4	10	12
Muff ...	24	9	3	6	1
St. Mura's, Burnfoot ...	110	48	27	21	14
Ture or Gortin ...	68	36	20	16	28
KILLEA	563	209	110	99	62
An Ceathramhadh Riabhach Burt	17	8	6	2	—
Burt I. (or Speenogue) ...	49	20	11	9	1
Carrigans ...	29	15	10	5	2
Carrowan ...	63	12	10	2	2
Cross Roads ...	30	11	4	7	1
Monreagh ...	33	4	2	2	—
Naomh Mhuire, Bridgend ...	81	16	12	4	5
Scoil Alt Achadh 'Doire ...	98	46	14	32	6
Scoil Cholmcille, Newtowncunningham ...	130	59	30	29	30
The Castle, Newtowncunningham ...	33	18	11	7	15
KILLYBEGS	68	27	10	17	14
Killybegs Commons	68	27	10	17	14
KILMACRENAN AND MILFORD	409	154	62	92	62
Carrownaganonagh ...	47	27	9	18	21
Kilmacrenan No. 1 ...	24	4	1	3	1
Milford ...	36	22	6	16	5
Milford ...	74	21	9	12	11
Naomh Colmcille, Kilmacrenan ...	80	28	14	14	8
Portlean ...	16	6	—	6	—
Termon ...	132	46	23	23	16
LAGHEY	223	136	49	87	102
Ballinakillew ...	37	26	12	14	20
Ballintra Robertson ...	29	8	3	5	5

TABLE A.—Continued.

DISPENSARY DISTRICT.	Number on Roll.	Total No. Inspected.	First Inspection	Second Inspection	No whose Parents Present
Drumahoul ...	24	11	5	6	5
Laghey ...	48	31	17	14	22
Laghey Bar ...	62	52	9	43	44
Tullynought ...	23	8	3	5	6
LETTERKENNY	121	50	28	22	18
Glencar ...	38	11	5	6	5
Glendooen (2) ...	33	27	12	15	4
Letterleague ...	50	12	11	1	9
MALIN	533	93	36	57	25
Aughaclay ...	91	24	12	12	8
Culdaff ...	14	2	—	2	—
Goorey ...	11	1	—	1	—
Malin Head ...	65	8	3	5	1
Malin ...	16	4	1	3	—
Naomh Buadain, Culdaff ...	57	17	8	9	3
Sgoil Chuil Caonaigh ...	157	16	1	15	4
Sgoil an Iorbaill Riabhaigh ...	122	21	11	10	9
MANORCUNNINGHAM	344	112	64	48	54
Ballyholey ...	30	5	4	1	1
Glenmaquin No. 1 ...	28	2	1	1	—
Glenmaquin No. 2 ...	45	7	5	2	5
Naomh Columcille, Manorcunningham ...	111	44	21	23	12
St. Patrick's, Lurgybrack ...	80	31	14	17	20
Ray ...	50	23	19	4	16
MOVILLE	914	286	65	221	66
Bredagh Glen ...	38	8	2	6	1
Carrowkeel ...	33	11	3	8	3
Cluneelly ...	71	7	1	6	—
Carrickmaquigley ...	36	20	6	14	5
Clare ...	29	8	4	4	2
Castlecary ...	16	—	—	—	—
Carrowbeg ...	5	4	—	4	—
Drung ...	48	16	3	13	1
Glenagivney ...	48	25	3	22	2
Moville Convent ...	127	51	18	33	34

TABLE A.—Continued.

DISPENSARY DISTRICT.	Number on Roll.	Total No. Inspected.	First Inspection	Second Inspection	No whose Parents Present.
Moville Boys' ...	111	35	6	29	9
Sgoil Naomh Ultain, Baile Charraighe ...	53	20	1	19	2
Sgoil Colmcille, Druim A'Mhaoir ...	92	19	2	17	1
Sgoil Mhuire, Shrubh ...	62	19	6	13	2
Sgoil Brighde, Moville ...	40	5	4	1	—
St. Patrick's, Carrowmeenagh ...	56	35	3	22	4
St. Columb's (Prot) ...	16	1	1	—	—
Whitecastle (or Cabry) Protestant ...	33	2	2	—	—
RATHMULLAN	293	114	42	72	41
An t-Easbog O Gallchobhair Kerrykeel (otherwise Glenvar) ...	61	15	4	11	6
Garbhain Sathloir, Rathmullan ...	76	52	18	34	14
Lurgan Boyce ...	50	11	4	7	—
Rathmullan Boys' ...	86	30	16	14	20
Rathmullan (Robt.) ...	20	6	—	6	1
ROSGUILL	530	240	85	155	158
Aughadahar ...	40	6	2	4	6
Carrigart ...	54	29	11	18	11
Cranford ...	24	17	6	11	7
Derryhassen ...	75	40	16	24	30
Gortnabrade ...	87	38	12	26	24
Glen ...	61	18	8	10	10
Kinelargy (Robt.) ...	47	13	3	10	13
Meevagh ...	47	14	13	1	13
Manorvaughan ...	14	11	3	8	—
Mulroy ...	37	23	5	18	18
Sgoil Cuil, Cranford ...	44	31	6	25	26
GRAND TOTAL	11,409	5,106	2,197	2,909	3,365

N.B.—The "Number on Roll" given in Table A refers to **the schools which were actually inspected** in a particular Dispensary District during the year 1940. In some Dispensary Districts the inspection of the schools was not completed during the year.

TABLE B.

SHOWING STATE OF CHILDREN IN MATTERS OF CLOTHING, FOOTGEAR AND CLEANLINESS.

	Unsatisfactory	Percentage	Very Unsatisfactory	Percentage	Total	Percentage
Clothing	210	4.1	53	1.0	263	5.1
Footgear	132	2.6	19	0.3	151	2.9
Cleanliness of head	482	9.4	179	3.5	661	12.9
Cleanliness of body	383	7.5	83	1.6	466	9.1

TABLE C.

GIVING A SUMMARY OF THE DEFECTS DISCOVERED DURING THE YEAR 1940.

DEFECT OR DISEASE	Total	Percentage	Marked Degree or for Treatment.	Percentage	Moderate Degree or for Observation.	Percentage
Malnutrition	253	4.9	22	0.4	231	4.5
Ringworm of Body	2					
Ringworm of Head	2					
Impetigo	15	1.6				
Scabies	55					
Other Skin Diseases	10					
Carious Teeth	2,572	50.3	2,113	41.3	459	9.0
Defective Vision	811	15.8	560	10.9	251	4.9
Squint	80	1.5				
Other Eye Diseases	49	0.9				
Hearing	3	0.06				
Ear Diseases	22	0.4				
Speech	18	0.3				
Tonsils and Adenoids	1,326	25.9	977	19.1	349	6.8
Cervical Glands	121	2.3	36	0.7	85	1.6
Submaxillary Glands	38	0.1	1		7	0.1
Heart Disease (Functional)	3	0.06				
Heart Disease (Organic)	34	0.6				
Anaemia	50	0.9	15	0.3	35	0.6
Bronchitis	34	1.0				
Other Non-Tuberculous Lung Conditions	16					
Definite Pulmonary Tuberculosis	2	0.04				
Suspected Pulmonary Tuberculosis	23	0.4				
Surgical Tuberculosis	12	0.2				
Rickets	11					
Hernia	5					
Epilepsy	4					
Other Nervous Condition	6					
Postural Defects	47					
Deformities	51					
Infectious or Contagious Diseases	5					
Mental Condition	4	0.07	1		3	
Other Diseases or Defects	30					

TABLE D.

SHOWING THE NUMBER OF CHILDREN UNVACCINATED ACCORDING TO DISPENSARY DISTRICTS.

DISPENSARY DISTRICT.	Number Inspected.	Number Unvaccinated.
Ardara, ...	277	16
Ballintra, ...	53	14
Ballyshannon, ...	616	49
Carndonagh, ...	157	—
Carrick, ...	390	20
Cross Roads (Bunbeg) ...	355	3
Dungloe (1) ...	355	30
Dungloe (2) Burtonport ...	713	71
Dungloe (3) ...	214	30
Fanad ...	208	—
Glenties, ...	187	7
Kilderry, ...	160	4
Killea, ...	209	32
Killybegs, ...	27	4
Kilmacrenan and Milford, ...	154	5
Laghey, ...	136	5
Letterkenny, ...	50	1
Malin, ...	93	1
Manorcunningham ...	112	5
Moville ...	286	6
Rathmullan, ...	114	7
Rosguill, ...	240	4
TOTAL, ...	5,106	314

TABLE E.

CLASSIFICATION OF CERTAIN DISEASES AND DEFECTS FOUND DURING SCHOOL MEDICAL INSPECTION IN THE YEAR 1940.

SKIN DISEASES.

Alopecia Areata	3
Eczema	2
Ichthyosis	1
Impetigo	15
Moles	1
Psoriasis	1
Ringworm of Body	2
Ringworm of Head	2
Scabies	55
Urticaria	1
(Unclassified)	1
TOTAL	84

EYE DISEASES.

Albinism	3
Blepharitis	38
Conjunctivitis	1
Defective Vision	811
Leucoma (Post accident)	1
Nystagmus	3
Ptosis	2
Strabismus	80
Other Conditions	1
TOTAL	940

EAR DISEASES.

Defective Hearing	3
Otitis Media	4
Otorrhoea	17
(Unclassified)	1
TOTAL	25

NON-PULMONARY TUBERCULOSIS.

Tuberculous Abcess of Thigh	1
Tabes Mesenterica	3
Tuberculosis of Bone	3
Tuberculosis of Glands	1
Tuberculosis of Joints	2
Tuberculosis of Spine	2
TOTAL	12

NERVOUS DISEASES.

Chorea	1
Convulsions	1
Epilepsy	4
Headache	1
Nocturnal Enuresis	3
TOTAL	10

DEFORMITIES

Bifid Uvula	1
Birth Palsy	1
Cleft Palate	1
Congenital Deformities	1
Genu Valgum	3
Genu Varum	1
Hammer Fingers	1
Pes Planus	13
Rachitic Deformities	10
Scoliosis	1
Sequel to Injury	6
Sequel to Polio-encephalitis (Paresis, etc.)	6
Talipes	1
Torticollis	4
Webbed Toes	1
TOTAL	51

OTHER DISEASES OR DEFECTS.

Angioma	1
Cyst on Eyebrow	1
Cyst on Lip	1
Ganglion on Knee	1
Parasites	1
Perthes Diseases	1
Phimosis	3
Pyorrhoea	1
Rheumatism	13
Thyroid Disorders	1
Tumour at back of Throat—Upper Pharynx	1
Quinzy	1
Other Conditions	4
TOTAL	30

TABLE F.

SHOWING THE NUMBER OF OPERATIONS FOR THE REMOVAL OF ENLARGED OR DISEASED TONSILS AND ADENOIDS IN THE VARIOUS COUNTY INSTITUTIONS DURING THE YEAR 1940.

Ballyshannon District Hospital,	...	1
Donegal District Hospital	...	4
Letterkenny District Hospital,	...	212
Lifford District Hospital,	...	164
TOTAL	...	381

TABLE G.

GIVING DETAILS OF DENTAL CLINICS HELD DURING THE YEAR 1940.

Total Number of Clinics held,	48
Number of Children in attendance,	1,542
Number of Children Treated,	1,540

TABLE H.

GIVING DETAILS OF EYE CLINICS CONDUCTED BY THE COUNTY OPHTHALMIC SURGEON.

Number of Children examined,	843
Number of Children for whom Glasses were prescribed,	801

TABLE I.

GIVING SUMMARY OF TREATMENT AFFORDED AT THE EYE AND EAR HOSPITAL, DERRY, DURING THE YEAR 1940.

1. EXTERN DEPARTMENT.

Number of Children in attendance,	36.
Number of Children Treated,	36.

2. INTERN DEPARTMENT.

Number of Children Admitted and Treated,	5.
Number of Children for whom Glasses were prescribed in the Eye and Ear Hospital,	37.